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ARCHIVES

OF

# OPHTHALMOLOGY

*FOUNDED IN 1869 BY*

DR. HERMAN KNAPP

*EDITED IN ENGLISH AND GERMAN*

BY

DR. ARNOLD KNAPP

OF NEW YORK

AND

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OF MUNICH

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## ARCHIVES OF OPHTHALMOLOGY.

RETINAL CHANGES IN ADOLESCENTS.<sup>1</sup>

By ARNOLD KNAPP, M.D.

*(With one colored plate.)*

**D**URING the last few years a number of papers have been published describing retinal changes in adolescents, which appear not to be particularly uncommon, and have suggested a number of new clinical pictures. The changes in the retina are found to be associated with lesions in the retinal veins, and have been brought by some into relationship with tuberculosis. I have had the opportunity of observing several cases illustrative of these retinal changes, which seem to me to be of interest, as our knowledge of this subject is still imperfect.

CASE I is that of Louise M., 25 years old, who came on April 15, 1911, to ask whether anything could be done for her right eye, which began to fail five years ago. A diagnosis of vitreous hemorrhage was made by the physician who then saw her. Not much attention was paid to this condition, and the sight was entirely lost some months ago.

The patient is pale, poorly nourished, and has always been delicate. She has, however, had no illness except diphtheria. Her father died of Bright's disease; her mother is living. Two other sisters are healthy. One brother is tuberculous and is now being treated for an eye trouble, which will be fully described later on. One other brother died of tuberculosis of the bladder.

*On Examination.*—Right eye is blind; the anterior segment of the eye is normal; the retina is totally detached, so

<sup>1</sup> Read before Section on Ophthalmology, N. Y. Acad. Med., November 18, 1912.

that the disk is recognizable only by the confluence of the vessels; the detachment is generally shallow; above, it is translucent, giving a faint pink reflex, and cholesterol crystals can be seen in the subretinal fluid. In the lower half underneath the detached retina there are a number of large yellowish-white exudates. The vessels in the detached retina show no peculiarities; there are two small round white areas near one blood-vessel. She has no complaint about the left eye, and the vision is normal. After dilatation of the pupil, a remarkable condition is found in the retinal veins in the periphery of the fundus (see drawing). The vitreous is clear. The optic nerve is congested and blurred, but not elevated. There are two small hemorrhages near the temporal margin. The changes in the retinal veins consist in round areas which measure about  $\frac{1}{3}$  of a papilla diameter. These areas are in direct relation to the retinal veins. The one in the lower field covers the vein, the margin is sharp and not pigmented, the color yellow. The one in the temporal field is situated on one side of the vein, which describes a distinct curve as it forms the margin of the area; this also has no pigment, is sharply defined, and of an ochre-yellow. The one in the upper periphery is slightly larger, distinctly grayish, with indefinite outline, and surrounded by a pale ring without pigment.

She would not permit a diagnostic tuberculin test, but because of the exact similarity of the ophthalmoscopic picture of the right eye to the condition in her brother's eyes, which will be described later, she was given the usual tuberculin treatment for about four months. During this time the ophthalmoscopic picture changed but little. The hemorrhages near the disk were absorbed and the phlebitic area in the upper periphery changed to two faint round foci surrounded by a pale ring. The patient then suddenly ceased attendance, and, on inquiry, we learned that she had become demented and had to be taken to the State Hospital for the Insane at Morris Plains, N. J., where she died, after a few days, from exhaustion. The hospital authorities saw no evidences of a tuberculous meningitis; no autopsy was performed.

CASE II.—The brother's case, from its bearing on our patient's condition, deserves some attention. J. L., 18 years old, states that the sight in the left eye was lost  $1\frac{1}{2}$  years ago. The right eye began to fail on July 1, 1910. He complains of headache, night sweats, but has gained in





weight. The boy is tall, rather apathetic, and poorly nourished. Purulent discharge from nose; right eye, on inspection, normal. V. =  $\frac{2}{60}$ . Field contracted to small area temporally from center; Wassermann negative. In both eyes the ophthalmoscope shows a detachment of the retina, proliferating retinitis, a hole in the retina (in the periphery), many large subretinal exudates, cholesterin particles, small hemorrhages in the retina, and in the periphery some retinal striæ. A diagnostic tuberculin injection gave a marked general reaction; unfortunately the presence of an ocular reaction is not noted in the history-record. He has come regularly for tuberculin treatment until his sister's death, but without any benefit. On November 11, 1912, the left eye presents the picture of an irido-choroiditis, with closure of the pupil, cataract, and secondary glaucoma. The right eye now has uncertain light perception. The pupil is dilated. The vitreous contains a whitish mass (detached retina) with a white exudate and three vascularized yellowish nodules. These can be seen by oblique illumination directly posterior to the clear lens.

The ophthalmoscopic condition in the right eye of Case I, and in both eyes of Case II, suggests the changes after intraocular hemorrhage (retinitis proliferans, detachment, retinal hemorrhages, retinal striæ), though the shallow transparent detachment, cholesterin crystals, and large exudates under the retina resemble somewhat Coats's retinitis with massive exudation<sup>1</sup> (retinitis exudativa<sup>2</sup>). The process was known to have begun in the right eye of Case I as a large vitreous hemorrhage. The accidental finding of periphlebitic foci and slight neuro-retinitis in the other eye of Case II may throw some light upon the morbid process. In any case it shows the importance of a careful ophthalmoscopic study of the retinal vessels of an apparently normal eye, if the other eye is affected. The nature of these round areas is hard to explain without an anatomic examination. They are unquestionably in the retina and are closely connected with the veins. They may be miliary tubercles, though their appearance is not quite that of the well-known miliary tubercles in the choroid. During an observation period of four months, they practically remained unchanged.

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<sup>1</sup> *Royal London Ophth. Hosp. Reports*, vol. xvii., p. 440, 1908.

<sup>2</sup> *Arch. f. Ophthalmologie*, vol. lxxxi., No. 2, 1912.



CASE III.—F. E. C., 23 years of age, tall, muscular, of good family history, stated, on June 14, 1907, that the vision in the right eye had been failing for four weeks. S. =  $\frac{10}{20}$ . The field shows peripheric contraction and a central scotoma. An extensive vitreous hemorrhage is present, and no details can be seen. The vision in the left eye is normal; the retinal veins are congested. He was treated with sweats, mercurial inunctions, potassium iodide, subconjunctival injections, without avail. On April 17, 1908, S. =  $\frac{2}{20}$ — $\frac{3}{20}$ ; an extensive detachment of the retina is present, with new-formed connective tissue on the detached retina and new blood-vessels. There are a few recent hemorrhages. The left eye is normal, though the veins are congested.

On February 12, 1909, he was seen again, stating that he had noticed fire-like streaks in the left, his good eye. On his looking down, with the ophthalmoscope a retinal vein is seen interrupted by a superimposed white patch, the lymph sheath about the vein appears injected, and there are many surrounding hemorrhages. He was thoroughly examined by Dr. Theodore Janeway, who found retarded blood coagulation and slight albuminuria. In April, 1910, a large hemorrhage occurred. He consulted several oculists; one of these, Dr. de Schweinitz, suggested tuberculin treatment. Dr. de Schweinitz very kindly informed me that the tuberculin test gave a general reaction, and during that winter he was given tuberculin injections by Dr. Baldwin at Saranac. I saw the patient again on June 1, 1911. The fundus examination revealed some peripheric hemorrhages in the retina. At the site of the previous periphlebitis, the vein forms a loop, turns back upon itself, and there is some connective-tissue proliferation. In two other parts of the fundus the veins show vascular loops; there are some new hemorrhages, but no exudates.

Publication from the Hirschberg clinic (Friedenwald,<sup>1</sup> Simon, Fischer) described, in the recurrent hemorrhages of adolescents, changes in the retinal veins. According to Cords,<sup>2</sup> Hutchinson,<sup>3</sup> in 1881, drew attention to the same condition. The relationship to tuberculosis has recently been mentioned especially by Axenfeld and Stock.<sup>4</sup> These authors speak of these cases as "recurring hemorrhages in the tuberculous,"

<sup>1</sup> *Centralblatt f. Augenhlk.*, 1896.

<sup>2</sup> *Zeitschr. f. Augenhlk.*, vol. xxvi., Nos. 5 and 6, 1911.

<sup>3</sup> *Trans. Ophthal. Soc.*, vol. i., 1881.

<sup>4</sup> *Klin. Monatsbl. f. Augenhlk.*, vol. xlix., 1911.



and regard the inflammatory lesions as toxic and non-specifically tuberculous. Fehr<sup>1</sup> has made an anatomical examination of one of these cases, and found an infiltration of leucocytes in the walls of the veins. In the experience of some, the treatment with tuberculin in certain cases has been much more successful than any other.

CASE IV.—M. H., 18 years of age, consulted me by the courtesy of Dr. F. Tooke of Montreal, on December 11, 1911, stating that the sight in the left eye became blurred three months ago. The vision with correcting glass is  $\frac{15}{80}$ . The anterior segment seems normal; there are vitreous opacities; optic neuritis; the retinal veins are full. An exudate covers the superior nasal vein, and the inferior temporal vein exhibits an area of perivascularitis. The field of distribution of the superior temporal vein, beyond the macula, is covered with small hemorrhages. At the bifurcation of the superior nasal vein, there are two small round whitish areas. A careful medical examination revealed nothing except a trace of albumin and a few hyaline casts in the urine. A diagnostic tuberculin injection was given, which was followed by a typical febrile reaction (100° F.), a reaction at the site of the injection, and a local reaction in the eye—*i.e.* the formation of three fresh hemorrhages near the bifurcation of the superior nasal vein. The patient returned home and was given tuberculin treatment with the result that, together with a gain in her general health, the fundus changes have all cleared up and her vision is normal in October, 1912.

Similar cases to this last one have been reported by Igersheimer<sup>2</sup> and others. The tuberculous origin of the retinal changes seems probable; at any rate, the result of the tuberculin treatment was striking.

In these three varieties of retinal lesions, occurring in adolescents, the primary pathological change takes place in the wall of the retinal veins. Cords (*l. c.*) states that certain cases of retinal periphlebitis, recurring vitreous hemorrhages, proliferating retinitis, and retinitis with massive exudation may be grouped together under the general heading of "Juvenile Retinal Augiopathy." Their relation to tuberculosis is

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<sup>1</sup> *Centralblatt f. Augenhlk.*, 1901.

<sup>2</sup> *Archiv f. Ophthalmologie*, vol. lxxxii., No. 2, 1912.

difficult to prove; the tuberculous origin in my cases seemed probable. The tuberculin treatment in one was successful; in one doubtful—the case is still under treatment; in two without avail.

## EYE TROUBLES CAUSED BY THE USE OF HAIR-DYES.

BY DR. JUAN SANTOS FERNANDEZ, HAVANA, CUBA.

FOR a long time we have been consulted almost daily, by women especially, in regard to the possible danger to the eyes and the sight from hair-dyes, used mostly to hide the whitening of the hair. Formerly our knowledge of this danger was obtained only through hearsay, as we had no opportunity of seeing any of these cases among our patients, and it is only in recent times that any specific information on the subject has been given us by medical authorities.

It seems probable that diseases of the eye may be occasioned by the dyeing of the hair, and that benign complications are much more frequent than imagined, and are unrecognized by the ophthalmologist because most of them have no serious after-effects. The patient usually consults the family physician, and frequently not until after the symptoms have passed, in order that the use of the hair-dye may not be discovered. We must admit, however, that although the practice of using hair-dyes is general, the proportion of eye troubles resulting therefrom is very small; but clinical work recently has revealed so many cases, that the attention of ophthalmologists has been directed to the subject. As it seems impossible to prevent people from using hair-dyes, even after they have been warned of the dangers arising therefrom, some action should be taken to regulate the manufacture of such preparations. We would suggest an act of legislature placing the manufacture of hair-dyes and similar cosmetics in the hands of chemists or other persons skilled in the use of drugs, whose duty it would be to use the least harmful substances and to mix them accurately.

Although poisoning from hair-dyes may appear an insignificant matter, it has been the subject of comprehensive works by Orfila and Devergie. In spite of what has been written on the subject, however, the popular preparations continue in favor with the people. In 1846, Vimmer published in the *Annales de chimie*, of Berzelius, a note on the use of pyrogallie acid for staining the hair a solid red. The solution was to be left on for some time, and then the hair rinsed thoroughly to prevent burning by the acid. Cases where an entire growth of hair has been destroyed in this way have been noted by barbers, but we have unfortunately no particulars. Besides Orfila and Devergie, Chevalier and Gaultier de Clubry have tried to find out a thoroughly innocuous preparation. The following formula is ascribed to Debay of the Paris faculty:

Lead Sulphate.....	4 grams
Hydrated Lime.....	4 grams
Water.....	30 grams

The following is also attributed to some authority on chemistry, but is far from being harmless<sup>1</sup>:

Distilled Water.....	1 litre
Lead Acetate.....	15 grams
Ammonium Hyposulphite.....	30 grams
Alcohol.....	15 grams
Glycerine.....	15 grams
Tinct. Bitter Almonds.....	10 drops

We have observed in the use of aniline preparations which are applied in shops where there is abundant water to wash off the excess of coloring matter, that the absorption was less frequent than when the application was made at home with less skill and insufficient rinsing of the hair. And if to this we add the practice of excluding the air from the head in order to obtain better color results, the probabilities of absorption are greatly increased.

Berger<sup>2</sup> observed not long ago one case of central scotoma with the vision reduced two-tenths, without discovering any lesion by the ophthalmoscope. Larmarque described a case of exophthalmos from orbital cedema, ocular hypertension,

<sup>1</sup> *Des teintures pour les cheveux et leurs dangers*, Henri Jouve, Paris, 1898.

<sup>2</sup> *Arch. f. Augenhk.*, 1904.

chemosis, and lachrymation. Chiari,<sup>1</sup> of Milan, has published a case similar to Berger's, in which, in spite of reduced vision, positive scotoma, and dyschromatopsia, the symptoms in the fundus were absent, and it was believed to be a retrobulbar neuritis. Laboratory experiments have proven the existence of an interstitial neuritis, localized in the optic nerve, and the eye troubles due to atoxyl may be attributed to the arsenical derivatives which are present in the modern hair-dyes and cosmetics. Affections of the eye caused by atoxyl were, as is well known, the basis of Ehrlich's rule of caution in applying 606 to persons afflicted with any vital ocular trouble. This precaution, however, is being disregarded, and to-day many ophthalmologists apply 606 without any risk.

The irritant action of many of the hair-dyes gives rise to the formation of vesicles on the scalp, the dried fluid from which produces crusts and causes the hair to fall out in tufts. This condition is accompanied by intense itching of the scalp; general indisposition and lowness of spirits, followed by vertigo; slight renal disturbances are frequently seen, and sometimes albuminuria or even uræmia may set in; cephalalgia, sleeplessness, dyspnoea, delirium, arrhythmia, and vomiting may occur, and there is almost always oedema of the face and eyelids. The ocular disturbances may at times be the only sign of poisoning, and they may occur without pruritus or other skin disorders; in the case published by Chiari, they were followed only by headache and vertigo. Some authors consider dermatitis to be the result of the poisoning; but we believe it the portal of absorption, because the irritation of the skin and the accompanying vesicles make the process of absorption very much easier. The effects, however, are due in most cases to the nature of the coloring substance and the susceptibility of the user. The oedema extends to the eyelids and closes them, and as this condition is usually followed by chemosis, the patient experiences great difficulty in opening his eyes and is, consequently, much alarmed. In most of the cases observed by us, the vision was not impaired, because as soon as the oedema of the eyes subsided, the patient got well; the fundus was not affected. Hair-dyes may be divided into four classes:

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<sup>1</sup> *Annali di Optalmologia*, vol. xxxviii., p. 882, 1910.



1. Decolorizing ( $H_2O_2$ ).
2. Vegetable Tinctures (less frequently used).
3. Tinctures with metallic basis; (dyes more frequently used; among which are: caustic potash, nitrates of silver and mercury; bismuth, acetates of lead and copper, nitric and sulphuric acids, and sodium hyposulphite).
4. Tinctures based on aniline derivatives. (In this class should be placed most of the modern hair-dyes.)

According to investigations made in the physiological laboratory of the Academy of Sciences, of Lyons, chlorinated paraphenyldiamin has a marked toxic influence on the system, its effect being compared to that of the ptomains. A monograph of Dr. G. Tissot, of the Paris University<sup>1</sup> which has kindly been loaned to me by my friend Dr. A. Gonzales Curquejo, of this city, contains a great deal of information in regard to hair-dyes, and is the most complete work I have read on the subject. Dr. Tissot gives proof that, although most of the dyes are advertised as vegetable compounds, they are in reality based on aniline derivatives treated with nitric acid. It is only necessary to saturate the hair with a solution of paraphenyldiamin salt and  $H_2O_2$  prepared as used, in order to produce a true aniline color; this possesses the real strength of an aniline solution and also its undoubted toxic characteristics. Not all preparations, of course, work in the same way; each one gives rise to certain disturbances according to the various drugs of which it is composed. The use of sulphur and its derivatives, mercurial and lead salt, results in cutaneous endosmosis, and traces of the drug appear in the urine before the appearance of any skin affections; while with the use of pyrogallie acid, silver nitrate, and phenyldiamin the skin eruption is seen before any symptoms of toxicity. My conclusions are as follows:

FIRST: All hair-dyes in use at the present time are more or less toxic in effect, and may give rise, under certain circumstances, to general and local eye troubles.

SECOND: The injurious effects experienced are of two classes,

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<sup>1</sup> *Des teintures pour les cheveux et leurs dangers*, Henri Jouve, Paris, 1898.

inflammatory and toxic, although both may be present at the same time. The trouble may be only ocular in character, or it may affect the general system as well as the eyes from the start.

THIRD: The dyes which do the most harm are those containing aniline derivatives. As they are very easily prepared, these are the dyes, most generally used.

FOURTH: Fortunately as the aniline derivatives are powerful colorants, a smaller quantity of the dye is necessary to produce the desired results, and there is, therefore, less danger to the eyes and the general health.

## PERIBULBAR IMPLANTATION CYST AFTER REMOVAL OF STAPHYLOMA OF CORNEA.

FROM THE GERMAN UNIVERSITY EYE CLINIC, PROFESSOR A. ELSCHNIG,  
PRAGUE.

BY DR. BERNARD SAMUELS, NEW YORK, VOLUNTARY  
ASSISTANT.

(With three figures on Text-Plate I.)

IN the entire literature there are to be found but few cases of large subconjunctival cysts, occurring after excision of staphyloma or exenteration of the eyeball. For this reason, and more especially because of its great size and the extent of orbital tissue invaded, the cyst described below would seem of particular interest.

*History.*—J. L., a laborer, aged 30, was admitted to the hospital, August 1, 1906. Six weeks before, a piece of coal blew into the right eye. An ulcer formed which was treated with drops and salve, but without improvement.

*Examination.*—Slight eczema of the lid, severe conjunctivitis, ciliary injection, photophobia, lachrymation. A staphyloma involves about three-fourths of the cornea, leaving only the lower margin unchanged. Slight scleral ectasia is present in the upper ciliary region.

Tension. — 1.

Vision. Hand movement before eye.

Light Perception. Candle at six meters.

*Operation.*—The conjunctiva was freed around the limbus. The four recti muscles were tenotomized, and each secured with a suture. The staphyloma was next excised. The free edges of the sclera were coaptated by sutures. Over the closed sclera the muscles were drawn and fastened. Suturing the conjunctiva to cover the wound completed the operation.



ILLUSTRATING DR. BERNARD SAMUELS'S ARTICLE ON PERIBULBAR  
IMPLANTATION CYST AFTER REMOVAL OF STAPHYLOMA OF  
CORNEA

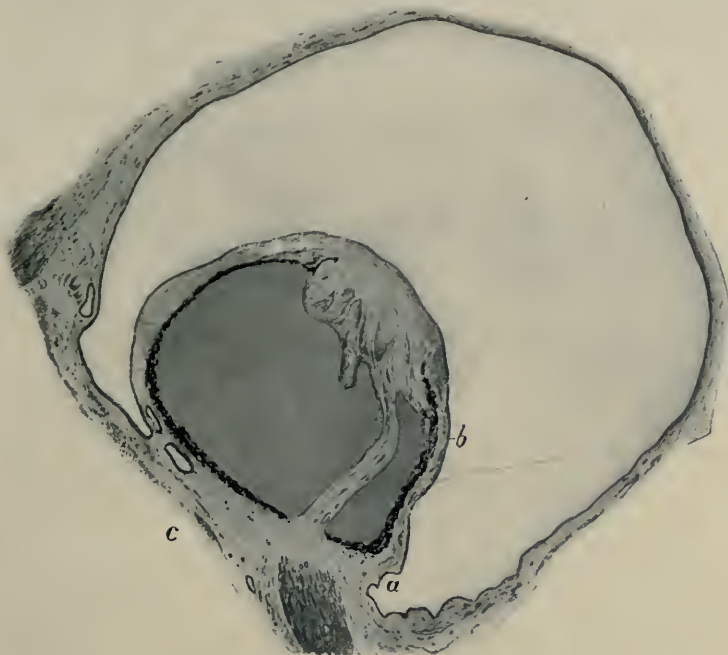


FIG. 1. Loup Magnification.

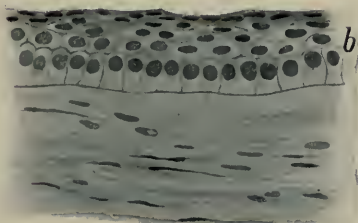


FIG. 2. Mag. 450.

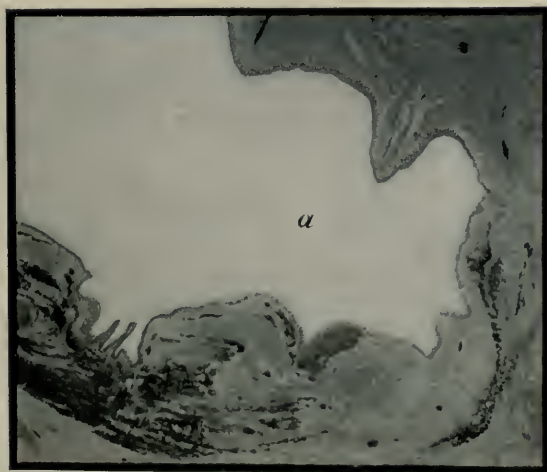


FIG. 3. Mag. 35.



The next day, patient was discharged.

In a year and a half the man came back to the clinic, and was fitted with a prothesis.

On January 19, 1910, over three years after the operation, he again returned, and related that for twelve months he had been unable to wear the prothesis.

*Examination.*—A cyst-like body, not unlike a fish bladder, fills the space normally occupied by the eyeball. The conjunctival covering can be but slightly elevated, being especially adherent over the central part, with numerous dilated blood-vessels crossing it. The formation appears to be divided into an inner and an outer half. The inner half is the more prominent, being pointed like a cone, and drawing the semilunar fold up with it. The transilluminating lamp gives the body a bright red appearance, without the slightest shadow anywhere.

*Operation.*—The enucleation was done under "ganglion anæsthesia." The conjunctiva was liberated, except over the central area, where it could not be detached without opening the cyst. The cyst proved to be irregularly spheroidal in shape, occupying an area in the orbit much larger than the normal eyeball. A small incision was made in the wall of the cyst, liberating a clear, limpid fluid. By enlarging the incision, the shrunken eyeball, with remains of sutures still visible, came to view. The eyeball lay at the bottom of the cyst, enveloped in its delicate wall, like a blossom in its calyx. The whole cyst with the eyeball was dissected out.

*Microscopical Examination.*—Extending across the anterior pole of the shrunken eyeball and opening outward and backward in all directions is the cavity of the cyst (Fig. 1). On the nasal side it reaches to a point considerably posterior to the entrance of the optic nerve in the sclera (Fig. 1a). Here the cyst forms a cul-de-sac, embracing the median aspect of the optic nerve. Only the posterior outer quadrant of the globe remains imbedded in normal tissue (Fig. 1c). The rest of its surface is invaginated in the wall of the cyst.

The outer wall of the cyst is composed of tough, poorly nucleated connective tissue of varying thicknesses. This wall is in the grasp of the recti muscles as they come forward to their attachment at the anterior pole. The thinnest and smoothest portion of the wall is at the nasal side, where the cyst bulges the most. In the cul-de-sac only a very thin layer of fibrous tissue is interposed between the cavity of the cyst and the dural sheath of the optic nerve (Fig. 1a). The ciliary arteries and nerves in this region are displaced by the cul-de-sac backward and inward on their way to the

sclera. At some places in the outer wall, small cysts occur between its layers. They are lined with epithelium, and most of them may be recognized to communicate with the large cyst within. Some of them appear to be like secondary epithelial blossoms that have grown into the wall of the cyst.

The eyeball measures in the sagittal diameter *12mm* and in the transverse diameter *15mm*. The sclera, which forms the inner wall of the cyst, is everywhere closed, so that no communication exists between the interior of the eyeball and that of the cyst. The anterior pole is replaced by a mass of scar tissue and striated muscle bundles. It has lost much of its spheroidal contour, particularly on the nasal side where it is quite flattened out. This is due probably to three factors: the contraction of the scar tissue at the anterior pole, to the drawing in of the wall by the cyclitic membrane within, and to the pressure exerted by the cyst without.

In the outer posterior ramifications of the cyst a few thin bands of connective tissue stretch between the walls as remnants left in the process of separation of the two surfaces.

A coating of stratified epithelium lines the entire cavity of the cyst. It has no basement membrane of its own, but lies everywhere in immediate contact with the connective tissue of the walls (Fig. 2). The number of layers composing the epithelium varies somewhat in different locations. On an average there are three to six layers of cells. As a rule the lining is thicker over the sclera than over the external wall. On the nasal segment of the external wall, where the wall itself is thinnest and smoothest, there are the fewest layers of epithelium.

Tufts of epithelial cells, especially in the recesses of the mass of scar tissue anteriorly and in the cul-de-sac posteriorly, grow out in the lumen of the cyst, like villi. In other places the epithelium dips down into the folds like secondary blossoms of epithelium, giving on cross-section the appearance of papillæ. The free surface of the epithelium of the outer wall is for the most part sharply defined and quite free of debris. That of the inner wall is generally quite ragged from disintegrating cells (Fig. 3).

The individual cells of the layers are also altered to an extent, according to where situated. As a rule, the lowermost layer consists of cuboidal cells, with well staining rounded nuclei, placed at the base. Often the cells of this layer are columnar, with a slightly cedematous protoplasm, and large oval nuclei, placed in the long axis of the cell. The middle layers are made up of rounded or polyhedral



cells, usually with oval, horizontally directed, and slightly staining nuclei. The innermost layers are almost everywhere pavement cells (Fig. 2).

The fluid of the cyst contains cell debris.

The interior of the eyeball presents the characteristic appearance of an atrophic eye. The retina is everywhere detached, and runs in a funnel from the optic nerve to the heavy cyclitic membrane anteriorly. In the cyclitic membrane are rests of the lens capsule.

The optic nerve is almost completely atrophic. From sections stained with Weigert-Pal's hæmatoxylin stain, that portion of the nerve next to the cul-de-sac appears to be more atrophic than the rest.

We have described above a cyst lined with epithelium, which developed after the removal of a corneal staphyloma, and which entirely surrounded a shrunken eyeball. To the present time only four analogous cases have been reported: Kroll (1), Possek (2), Loevenich (3), and Boer (4). In every one of them the cyst followed the excision of a cornea staphyloma. In three (Kroll, Loevenich, Boer), they were situated not entirely epibulbar, but extended through the unclosed corneo-scleral junction into the interior of the eyeball.

In the case of Possek, on the contrary, the cyst was epibulbar, without any communication with the interior of the eye.

In regard to the cause, the cysts of Possek and Boer were due, following the opinion of the authors, to an invagination of the conjunctiva by the sutures. Loevenich attributed the cysts to an implantation of conjunctival epithelium. He cited in favor of his theory the well known implantation cysts in the anterior of the eyeball, that occur after perforation at the corneo-scleral junction.

The cysts so far reported have all been confined to the anterior part of the eyeball. The one described by us here spreads posteriorly to the optic nerve, invading the entire space of Tenon, and hence attaining the greatest growth of any cyst of its kind on record.

Without doubt, we have here to do also with a case of implantation cyst. It seems to me idle to discuss whether these cyst formations take their start from an invagination of conjunctiva at the time of suturing, or through an ingrowing of

the conjunctival epithelium during healing of the wound, or, finally, a thing analogous to the origin of cysts in the anterior chamber, whether implantation of particles of epithelium does not take place under the sutured conjunctiva.

When one considers the well known property of transitional epithelium to proliferate, especially that at the limbus, it is to be wondered that implantation cysts are not more frequent after extirpations of staphylomas, exenterations, and enucleations. It may be mentioned at this point that Elschnig<sup>1</sup> records the appearance of small cysts in scars after squint operations. At all events, the cases observed give the indication that all wounds in the conjunctiva, as well as those made in the removal of staphylomas of the cornea, should be accurately sutured. Elschnig employs, therefore, the tobacco-pouch knot, which never fails to bring about an exact adaptation of the edges of the wound.

Whether an implantation cyst will develop into a purely epi- or peri-bulbar cyst, or whether it will invade the interior of the eye, depends largely on the manner in which the wall of the eyeball is closed. For example, after the removal of a staphyloma, if the corneo-scleral wound is sutured, there is every probability that an implantation cyst in this case would be purely peribulbar. On the other hand, after the removal of a staphyloma, without suturing the eyeball, as is so often done, if the conjunctiva alone is united by a tobacco-pouch knot, there is very small likelihood of implantation of epithelium in the interior of the eye.

For the opportunity to report this case, as well as for assistance in the study of it, I am greatly indebted to my chief, Prof. Dr. Anton Elschnig.

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<sup>1</sup> Czermak's *Die Augenärztlichen Operationen*, herausgegeben von Elschnig, I Bd., S. 527.





ILLUSTRATING DR. TOOKE'S ARTICLE ON CALCAREOUS DEGENERATION OF THE  
CORNEA AND LENS CAPSULE.

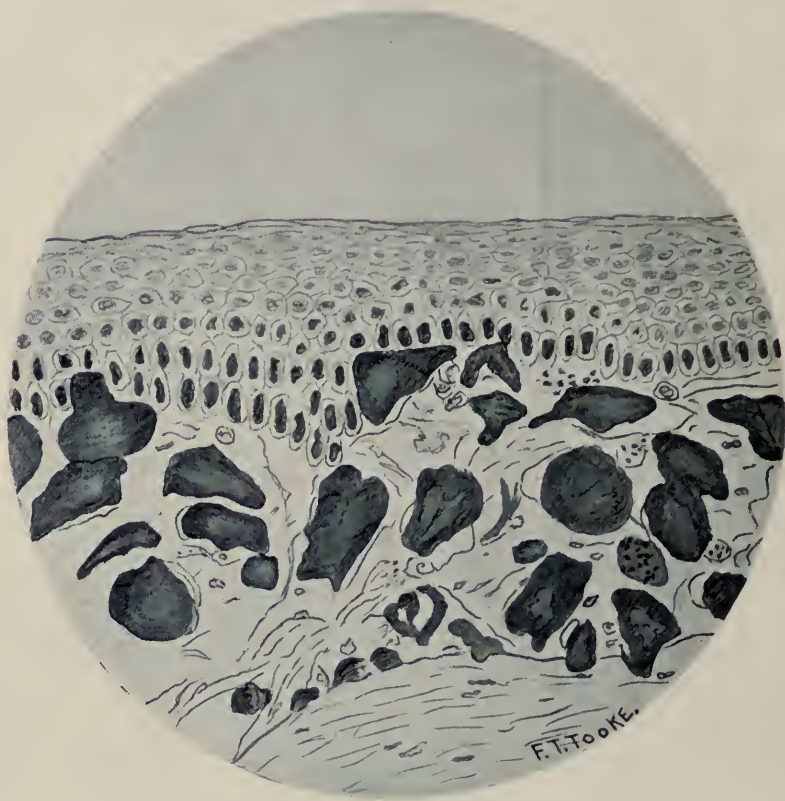


FIG. 1.—Reichert. Obj. No. 6. Polymorphous plaques in superficial layers of substantia propria as well as occupying the site of a degenerate Bowman's membrane. No evidences of a previous inflammatory disturbance. Section taken from center of pupillary area.



FIG. 2.—Reichert. Obj. No. 3. Occlusion of filtration angle; root of iris in opposition to Descemet's membrane, otherwise anterior chamber is of normal depth.

## CALCAREOUS DEGENERATION OF THE CORNEA AND LENS CAPSULE.<sup>1</sup>

BY DR. FREDERICK TOOKE, MONTREAL, CANADA.

(With two figures on Text-Plate II.)

LESIONS of the cornea manifesting calcareous changes have been variously described clinically as calcareous keratitis, primary or zonular opacity of the cornea, transverse film of the cornea, keratitis trophica and keratitis or "kératite en bandalette." Some authors have attributed these opacities to an excess of uric acid, while others consider them due to external injurious influences.

Referring to the ribbon-shaped variety of opacity, Ball<sup>2</sup> says that it may be either congenital or acquired; the former type is of exceedingly rare occurrence. In the acquired form it is present in two distinct clinical types; in the one the interpalpebral part of the cornea of eyes which were previously normal becomes opaque owing to the development of a smooth, subepithelial covering; in the other type an oval transverse band develops in eyes which have long been blind from iridocyclitis, sympathetic ophthalmia, or from glaucoma. This form of opacity produces a roughening of the cornea, and occurs chiefly in the lower third of this tunic. Since this is the part of the eye which is exposed when the globe is rolled upward, as in sleep, the condition has been considered to be due to imperfect closure of the lids while sleeping or in the course of exhausting diseases; in other words, an exposure keratitis.

In the first type the local change consists in a deposit of

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<sup>1</sup> Read at meeting of American Ophthalmological Society, Atlantic City, June, 1912.

<sup>2</sup> *Modern Ophthalmology*, pp. 334-346, 349-351.

lime salts beneath the epithelium which is unaffected. The opacity is sharply defined, while the remaining cornea is clear. This opacity may form a gray area, 3 to 5 mm in width, passing across the cornea below the center of the pupil. There is frequently an oval opacity at the outer and another at the inner part of the cornea, separated from the limbus by clear corneal tissue. The two oval masses are connected by a bridge through which the pupil can be seen.

Lime salts may be deposited in the cornea either in connection with hyaline degeneration or without such association. Such deposits sometimes occur superficially as band-like opacities, sometimes as infiltrates of small particles, and occasionally in old scars as larger plate-like masses. De Schweinitz<sup>1</sup> has recognized a clinical condition of retrogressive changes with the deposition of hyaline masses and lime particles in thick corneal scars and staphylomata, and refers to various forms of treatment.

A lattice form of opacity of the cornea as described by Freund<sup>2</sup> is hardly comparable to the case under consideration. It is of hereditary origin, its commencement is gradual, and it reaches its full development between the ages of thirty and forty. The opacity is thickest in the center of the cornea, both eyes are also affected, and the deep as well as the superficial layers of the cornea are involved.

Gilbert<sup>3</sup> thinks that the calcification of superficial scars is secondary to hyaline degeneration, since the lime deposits are never found without the hyaline, while hyaline substance occurs alone; but it, in turn, is secondary to coagulated fibrin. When Bowman's membrane is not destroyed in leucomata, it is found to be involved in the degeneration. He further considers some disturbance of the local nutrition and metabolism as being the principal factor in producing the pathologic changes.

Fuchs<sup>4</sup> says that the anatomic changes which underlie zonular opacity of the cornea consist in the deposition of lime in the form of very minute granules in Bowman's mem-

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<sup>1</sup> *Diseases of the Eye*, pp. 339, 361-362.

<sup>2</sup> *Graefe's Archiv f. Ophth.*, vol. lvii., 1903, p. 2.

<sup>3</sup> *Graefe's Archiv f. Ophth.*, 1909, vol. lxxii., S. 337.

<sup>4</sup> *Lehrbuch der Augenheilkunde*, ii Aufl., S. 243.



brane, which later becomes opaque, white, rigid, and brittle. In the spots where the calcification is far advanced one ordinarily finds new-formed connective tissue on Bowman's membrane, between it and the epithelium; owing to the presence of this tissue the surface of the epithelium tends to become irregular. Acting in the opposite direction the connective tissue pushes Bowman's membrane backward, causing breaks in it and displacement of the broken portions. In advanced cases minute granules of lime also make their appearance in the lamellæ of the substantia propria lying beneath Bowman's membrane.

So very little has been written upon this rather obscure form of corneal degeneration from a pathologic standpoint that I am presenting this case before the Society as one of interest and consideration.

E. P., a male, of French Canadian extraction, aged forty-two, came to the Royal Victoria Hospital, Montreal, complaining of recurring attacks of pain and inflammation in and about the eyeball. He stated that up to a year and a half previous to his admission the eye had been a normal, healthy one. At the time referred to, while working in a sand pit, some material was forcibly blown into his eye; he was temporarily blinded, and from his description of the course of events, a superficial ulcer of the cornea must have followed. The patient stated that he did not seek for special advice, and that the eyesight was gradually lost, completely so at a comparatively short time after the accident. Recurring attacks of pain and inflammation manifested themselves, subsiding only to recur with greater intensity. The attacks finally became so severe that he decided to come to Montreal for relief.

As seen at the eye clinic the patient was a strong, vigorous man, and healthy in all particulars save his injured eye. On examining the cornea, a round, dense scar was noted in the center completely covering the pupillary area. It occupied about the central quarter or third of the corneal surface, and was yellowish gray in color, and was but slightly flattened. The corneal epithelium was intact over this opacity, the substantia propria not staining with fluorescein, and there did not appear to be any ingress of superficial vessels into the apparently healed scar. The opacity completely covered the pupillary area, the peripheral fibers of the iris seemed to be normal, the anterior chamber was of normal depth and free from exudate. There was a very moderate

degree of circumcorneal injection with some congestion of the branches of the anterior conjunctival veins. The intraocular tension was distinctly raised, and perception of light was absent.

The eye was enucleated as blind, the result of an advanced glaucomatous process, and recovery was uneventful. After fixing the specimen in formalin, the eye was frozen and bisected. While doing so the lens became detached from the zonule, and when separated from the eyeball I further tried to cut it across, it cracked unevenly like an eggshell, a degenerate cortex escaping from within the calcareous fluid of very much the same consistence as egg albumin. The covering which I have described as an eggshell was white in color, perfectly regular and smooth as regards its surface, but rather rougher on its inner surface, although the color is unchanged. By treating a particle with dilute sulphuric acid a distinct effervescence occurs, liberating free carbon dioxide and forming the characteristic calcium sulphate or gypsum crystals, proving the substance to be a true calcium carbonate. Staining and mounting a small particle with Loeffler's methylene blue as well as with hematoxylin does not reveal any of the features of true bone tissue, the specimen showing up as an amorphous mass which appears to absorb the methylene blue particularly well.

The anterior portion of the eyeball was imbedded and mounted in celloidin, and sections stained with hematoxylin and eosin, with methylene blue, and with Van Gieson's stain. The sections show a distinct proliferation of the corneal epithelium over the pupillary area, the superficial cells being of the stratified type. Beneath the epithelial layer one comes upon Bowman's membrane, which is not wrinkled or altered at its periphery; at the center of the section, however, this membrane appears to have undergone a distinct degenerative change. At some points it appears to be swollen, at some places atrophied, and at others a certain degree of coarsely granular change has taken place in the membrane not noticeable in other tissues in the section. There is, apparently, no areolar or connective tissue between the epithelial layer and Bowman's membrane, and superficial vessels are not to be seen in the center of the section.



There appears to be a certain degree of hyaline degeneration beneath Bowman's membrane, the definite or distinct layers of the cells of the substantia propria manifesting a certain element of degenerative alteration seldom noted in non-inflammatory conditions of the cornea. About Bowman's membrane, and beneath it in these areas of hyaloid change, are large, irregular, amorphous masses which cut with a definite element of resistance and grittiness, leaving the corneal tissue about them rather shredded and torn. These masses stain regularly and intensely with methylene blue, as well as by hematoxylin; they stain particularly well with the iron hematoxylin as employed in Van Gieson's stain. These plaques are noticeable in the superficial layers of the substantia propria of the cornea, some, in fact the most, either in or directly beneath Bowman's membrane, while other deposits are seen above it, appearing in some instances to shove the epithelium away from the hyaloid tissue (Fig. 1). One can, in fact, notice certain instances where the salt appears directly contiguous with Bowman's membrane at one end, the crystal projecting upward into the epithelial cells in the opposite direction, while some of the epithelium would appear to undermine this deposit, apparently separating part of it from the hyaloid tissue beneath.

This deposit or concretion is distinctly most intense about the center of the sections, and is confined chiefly to the more superficial strata of cells. Microscopically one cannot detect the actual presence of any blood-vessels either of recent or of previous origin; further, one is able to note scattered throughout the superficial cells of the substantia propria but very few lymphocytes as evidence of an earlier inflammatory condition and possible vascularization. At the limbus, however, one may notice a deposit of these cells about the walls of the terminal superficial blood-vessels. One is hardly prepared to state whether this deposit has been laid down from the blood-vessels or through the lymphatics. In all probability the former idea would be substantiated from a view of the sections if one is to consider the evidence of Leber,<sup>1</sup> as well as that of Sachsalber,<sup>2</sup> who state that hyaline concre-

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<sup>1</sup> *Bericht der Ophth. Gesellsch.*, 1897.

<sup>2</sup> *Beiträge z. Augenheilk.*, xlviii., 1901.

tions eventually become calcareous, but that calcification occurs also by primary deposition.

Regarding the ingress of these cells into the epithelial layer of the section, my findings would appear to bear out the statement of Parsons,<sup>1</sup> who finds that calcareous deposits in and on Bowman's membrane lead to its being broken up both vertically and longitudinally. He further states that the masses are frequently pushed up into the epithelium, which is always more or less altered, often degenerated, and atrophic. The same author also remarks on the presence of new connective tissue elements about the calcareous masses, attributing this to the irritation which they set up. Giant cells in some cases have been noticed; they are absent in the case under discussion.

The presence of a calcareous substance in the cornea not being anticipated clinically, chemical tests were not attempted with the fresh tissue before it was imbedded. The subsequent treatment of the sections when imbedded was only partly satisfactory, as they did not permit of a sufficient amount of lime salts to be deposited for a routine chemical examination. The treatment of the sections, however, beneath the microscope under low power with dilute sulphuric acid produced a distinct effervescence; but disintegration of the lime salts with the celloidin was so intense that the character of the anticipated calcium sulphate crystals could not be distinguished.

On examining the filtration angle, one can notice a characteristic occlusion at this neighborhood (Fig. 2). The root of the iris is in apposition to Descemet's membrane for some distance, but the chamber itself is of normal depth. Although the iris would suggest a condition of chronic inflammation by a distinct infiltration of leucocytes, still there is no exudate within the anterior chamber, and synechiæ are not present. There is, further, but little engorgement of the vessels of the ciliary body, no plastic exudate can be made out upon the ciliary processes, and cyclitic dots are not present.

The condition in the cornea is not to be confounded with hyaloid degeneration, as noted in old leucomata, anterior staphylomata, and band-shaped opacity. This may also

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<sup>1</sup> *The Pathology of the Eye*, vol. i., pt. 1, pp. 242-243.

appear yellow in color, and seem to project above the surface of the cornea. This condition is usually limited to the more superficial layers of the corneal tissue and appears microscopically as homogeneous, highly refractile globules. The earlier evidences are minute granules which coalesce to form round globules, finally into larger masses, which generally show their mode of growth, as Parsons further states, by accretion in their crenate edges. Such material is very insoluble, resisting most reagents with the exception of concentrated alkalis, and acids. Its staining properties, too, differ somewhat from that of calcium salts, absorbing acid fuchsin and methylene blue, but staining poorly, if at all, with hematoxylin. Weigert's fibrin stain colors the granules but not the larger globules; the reaction of other staining materials shows by the variety of effect that one is dealing in such instances with no stable chemical body. This is further demonstrated by the fact that amyloid reactions are occasionally given typically, but more frequently in an indefinite manner or not at all. The microscopic features of such lesions have been thoroughly discussed by Baquis<sup>1</sup> and others.

Regarding the condition of the lens capsule, I consider that I am dealing with a unique condition. It is known that calcification of the lens may occur within the intact capsule, and that it is frequently found in the final stages of complicated cataracts and in shrunken globes. Partial calcification is met with in old anterior capsular cataracts. Actual ossification of the lens can only occur after a rupture or wound of the enveloping capsule, since only under these conditions can osteoblasts gain access to the interior. H. Müller and Knapp<sup>2</sup> have denied the possibility of ossification, Virchow has doubted it, while Berthold<sup>3</sup> held that it had not been demonstrated. Parsons,<sup>4</sup> to whom I have already referred, says that there is no question as to its occurring in old shrunken globes after rupture or absorption of the capsule and invasion of the lens by connective tissue of cyclitic origin.

The condition in the lens, as well as in the cornea, is not to be confounded with that of an actual bone formation as

<sup>1</sup> *Archiv f. Ophthalm.*, xlv., 3, 1898.

<sup>2</sup> *Archiv f. Ophthalm.*, xi., 1871.

<sup>3</sup> *Archiv f. Ophthalm.*, xvii., 1, 1871.

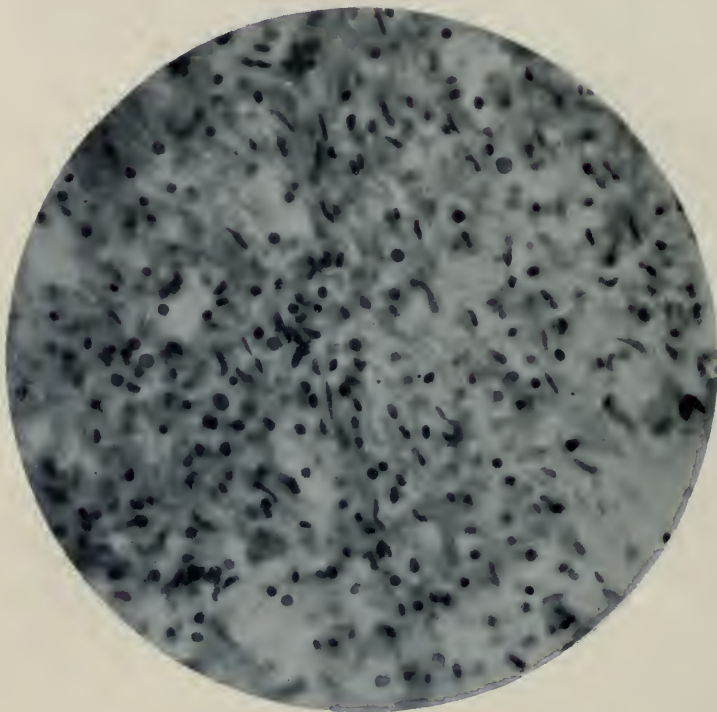
<sup>4</sup> *The Pathology of the Eye*, vol. ii., p. 427.

found as a post-inflammatory feature in old atrophic eyes. The condition met with here I hold to be a primary degenerative process purely, not preceded by previous inflammatory alterations. The secretion of calcium salts in this instance is quite comparable to that form of degeneration exhibited in the formation of vesical or renal calculi. How the deposit of lime salts is laid down in the capsule I am unprepared to say. One can suggest, however, that with the complete calcification of the capsule necrosis of the cortex results with an ensuing autolysis or self-digestion of the lens fibers—a process quite different to bony degeneration, where the fibers of the cortex would be included in the pathogenic process. The occurrence of a deposit of lime salts in two separate hyaloid membranes of the eye is particularly interesting, and perhaps of some significance at the present time, in view of the diversity of opinion held by Wells and Klotz regarding calcareous alterations in the arteries; the former holding that the condition arises from hyaloid elements, the latter, that it is preceded by fatty degeneration.

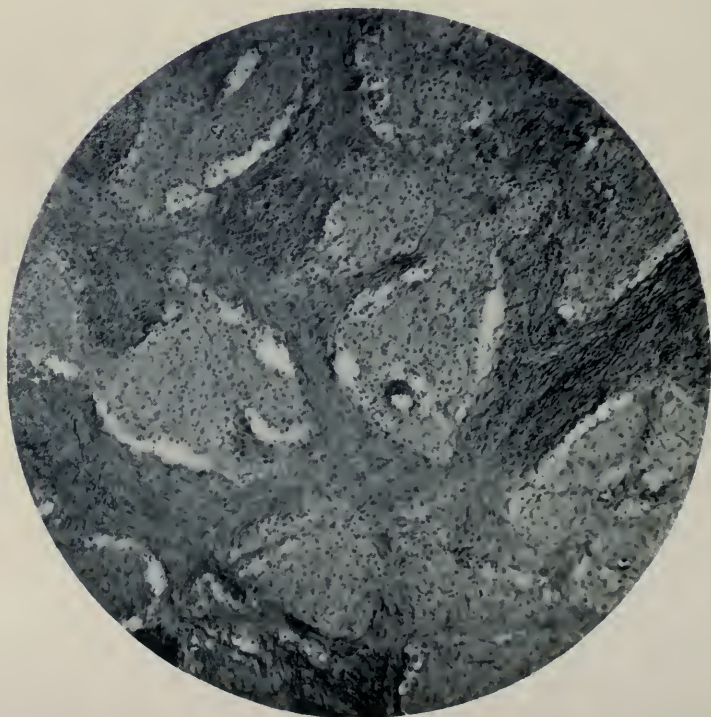
Eye, Ear, Nose & Throat Hospital.



ILLUSTRATING DR. SATTLER'S ARTICLE ON SHORT CLINICAL ACCOUNTS WITH  
MICROSCOPIC DEMONSTRATIONS OF TWO CASES OF TUMOR OF  
THE OPTIC NERVE.



CASE I. Transverse Section



CASE I. Van Gieson Stain



# SHORT CLINICAL ACCOUNTS WITH MICROSCOPIC DEMONSTRATIONS OF TWO CASES OF TUMOR OF THE OPTIC NERVE.<sup>1</sup>

BY DR. ROBERT SATTLER, CINCINNATI.

(With four figures on Text-Plates III and IV.)

## I

### FIBRO-SARCOMA OF THE OPTIC NERVE.

THE points of clinical interest were the slow growth of the tumor mass, with preservation of almost unimpaired vision until five months before the operation. At this period, increasing exophthalmus with irritability of the eye, from exposure, yet with perfect mobility of the globe, made surgical interference a necessity.

The tumor was removed with resection of the outer wall of the orbit (Kroenlein), the globe preserved, and the lids closed with temporary sutures.

Five days afterwards, excessive swelling and pain due to sphacelation of the cornea made enucleation necessary. A tedious recovery followed. Sixteen months later, the apex of the orbit was occupied by a dense, flattened, painless mass and there was also, at this time more than a slight prominence of the left eye, but without complaint or impairment of vision. Recent reports, almost two years since the operation, aside from considerable loss of weight, make favorable mention of the health of the patient.

*Pathological Report.*—The tumor is pyramidal in shape and has four sides with rounded edges, the base is almost rectangu-

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<sup>1</sup> Read at the Forty-eighth Annual Meeting of the American Ophthalmological Society, June 12-13, 1912, Atlantic City.

lar. The optic nerve extends through the center of the tumor from the base to the apex. The surface is smooth with here and there a tab of orbital fat adherent. The tumor is of firm consistence and has a creamish-gray color. The widest of its four margins at the base measures 2.75cm. The length, from base to apex, is 3cm. Weight 8gm.

Microscopically, the tumor is found to be made up of rather dense fibrous tissue, infiltrated with small round cells in variable numbers. In places, these round cells are found in aggregations or clumps, closely packed together with a very small amount of intervening tissue. Here and there through the tumor, cells of the epithelial type, having a large oval nucleus, are found in the fibrous reticulum, a few cells having a spindle-shaped nucleus. The tumor had a few blood-vessels but is comparatively non-vascular.

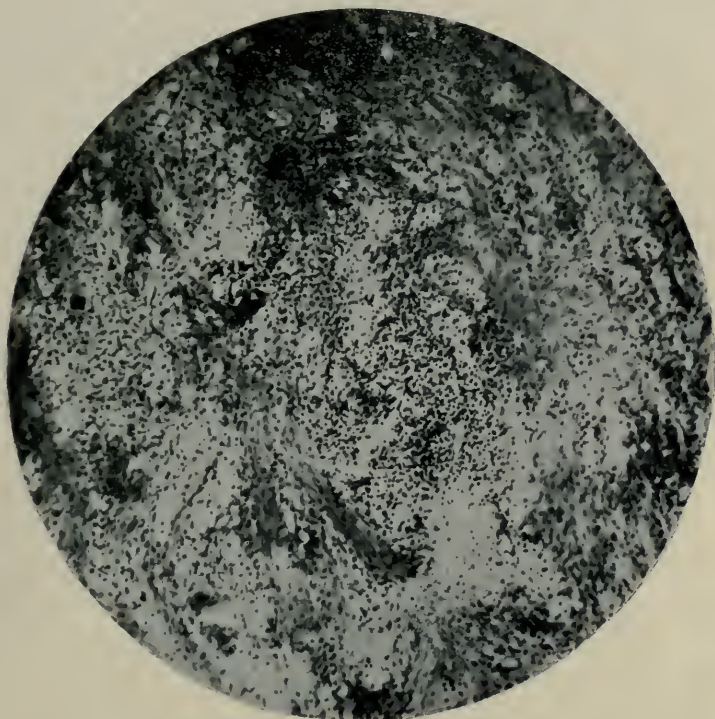
The cross-sections containing the optic nerve show that the pia is normal; the pial septa are not thickened and the nerve itself, aside from containing a few nuclei belonging to adventitious cells, appears quite normal. The arachnoid is distorted and densely infiltrated with nuclei. On slightly more than half the circumference of the nerve, the dural sheath cannot be differentiated, evidently having been replaced by the new-formed tissue. In the remaining portion of the nerve's circumference, the innermost part of the dura contiguous with the intervaginal space can be traced as a delicate line, apparently but little altered, while the more external layers merge by insensible gradations into the tumor proper. While there is a slight tendency of the cells to become grouped in alveoli, and the presence of cells of the epithelial type, in a certain measure, suggests classifying the neoplasm as an endothelioma, the general morphology is quite different from that of the typical endothelioma. The neoplasm is a fibro-fying sarcoma of the round-cell type and should be classified, without further modification, as a fibro-sarcoma, apparently having its origin in the dura mater.

## II

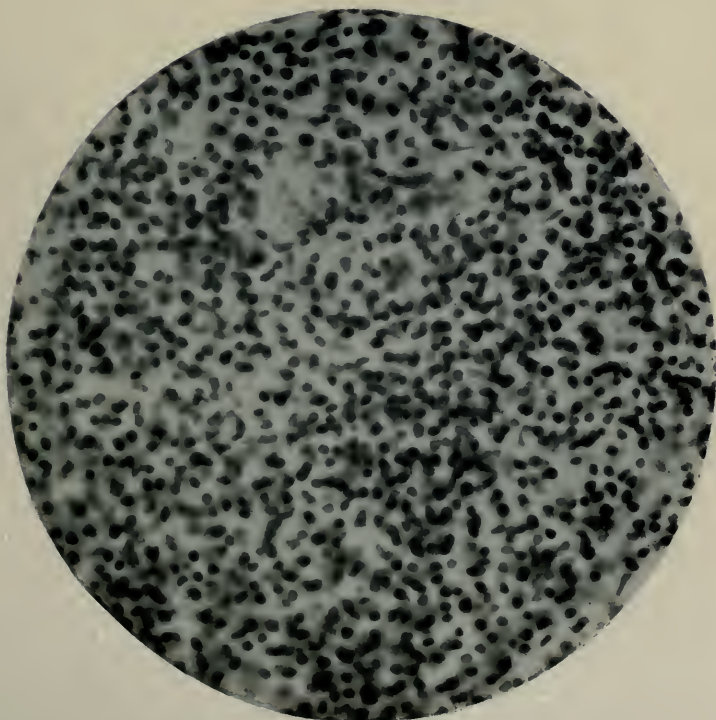
### INTRA-DURAL FIBRO-SARCOMA OF THE OPTIC NERVE.

In this patient, a boy aged four, rapidly advancing exoph-

ILLUSTRATING DR. SATTLE'S ARTICLE ON SHORT CLINICAL ACCOUNTS WITH  
MICROSCOPIC DEMONSTRATIONS OF TWO CASES OF TUMOR OF  
THE OPTIC NERVE



CASE II. Longitudinal Section



CASE II. Transverse Section





thalamus of the right eye was noted by the parents during the preceding five months, and during the last month, increasing irritability from exposure and insufficient lid protection were added. Aside from optic atrophy, there was nothing otherwise noteworthy. The child was fretful, but that was readily accounted for by the excessive irritability of the eye due to the marked proptosis. Perfect mobility of the globe remained. The removal of the tumor was accomplished without resection of the outer wall of the orbit and an encapsulated, hard, egg-shaped mass, fully one inch long was removed. The attachment to the apex of the orbit was firm and broad and its removal was only possible after careful dissection from the globe from which, as it was attached only by the optic nerve and its much thickened sheaths, it was easily separated. An attempt to save the globe was made, but in spite of every precaution it became necessary to enucleate it. This was done several days after the removal of the tumor. An uneventful recovery followed.

Fourteen months after the operation the patient was reported in good health.

*Pathological Report.*—Tumor somewhat egg-shaped, of grayish-yellow color and of firm consistence. The surface smooth, with the exception of one small, area which has strands of tissue with small, fatty masses adherent to them. The length of the mass is 3cm and its greatest circumference transversely is 6.5cm, weight 6.5gm.

At the end of the tumor there is a short pedicle of optic nerve and upon cutting the mass longitudinally, the optic nerve is found to extend somewhat excentrically through the tumor for some distance, but gradually becomes lost in the growth. Upon transverse section the growth is found to be surrounded by a definite capsule, which, upon microscopical examination, proved to be the attenuated dura.

The optic nerve has the appearance, in cross-section, of a white core, having a diameter which is somewhat greater than that of the normal nerve, while the bulk of the tumor is seen to be made up of the tissue interposed between the nerve and the dura. Microscopically, the neoplasm proper is found to consist of a reticulum of fibrous tissue which is infiltrated abundantly with nucleated cells. Upon examination of the



optic nerve, stained by Von Gieson's method, the pial septa were found greatly thickened so that the meshes of the interstitial tissue are practically obliterated in places; but in addition to this hyperplasia of the pial septa, a definite invasion of the nerve by dense, fibrous tissue, rich in nucleated cells, which in places entirely replaced the parenchyma of the nerve. This invasion of the optic nerve by new-formed tissue is not concentric and equally progressive from all parts of the periphery of the nerve, but is greater in some places than others, so that certain areas are quite free from this new-formed tissue. The pia itself is thickened and infiltrated with nucleated cells. The central vessels of the nerve have thickened walls.

The predominant element of the tumor is fibrous tissue; the growth evidently belongs to the connective-tissue group, and the cellularity warrants placing it in the class of sarcomata.

The neoplasm is then a primary intradural fibro-sarcoma of the optic nerve. The globe showed changes incident to a severe plastic irido-cyclitis only.

I am indebted to Dr. Geo. H. Knapp, for the painstaking and complete pathologic examinations of these cases.

# THE CLINICAL COURSE OF CONJUNCTIVAL AFFECTIONS ASSOCIATED WITH SO-CALLED TRACHOMA BODIES.<sup>1</sup>

By Dr. MARTIN COHEN, NEW YORK.

**A**FTER a joint paper, published two and a half years ago by Dr. Noguchi and myself<sup>2</sup> on "The Relationship of the So-called Trachoma Bodies to Conjunctival Affections," I considered it important to keep under observation all the available cases on which depended our hypothesis that the trachoma bodies are the etiological factor of an independent conjunctival affection. All the cases in which the trachoma bodies were detected in conjunctival smears by Dr. Noguchi at varying intervals up to date can be grouped under the following three classes:

I.—TRACHOMA		
Types and Stages	Original No. of Cases	Number of Cases Resulting from Infection
a. Hypertrophic (with pannus)	3	7
b. Papillary (without pannus)	2	6
c. Follicular or granular	1	3
d. Atrophic or cicatricial	3	3
II.—BLENNORRHOEA NEONATORUM NON-GONORRHOICA		
	6	2
III.—BLENNORRHOEA GONORRHOICA IN YOUNG GIRLS		
	6	20

<sup>1</sup> Read before the Ophthalmological Section of the Academy of Ophthalmology and Oto-Laryngology at Niagara Falls on August 21, 1912.

<sup>2</sup> Hideyo Noguchi and Martin Cohen: "The Relationship of the So-called Trachoma Bodies to Conjunctival Affections." *Archives of Ophthalmology*, 1911, xl., 1.

The object of this paper is to deal with the clinical course of those cases in which infection is believed to have originated from some one of the three types. The infections referred to in the tabulation occurred in asylums, hospitals, and families where the source of infection could usually be traced and its effects noted at definite intervals.

The clinical course was probably little influenced, if at all, by the mild therapeutic measures which were employed in most of the cases; in some of them no local treatment whatever was given.

The affections mentioned are usually communicated by fingers or articles coming in contact with the conjunctiva. Through observation of groups of cases I became convinced that some individuals escape infection, though subjected to the same exposure as those infected. In other cases there was a milder infection with a shorter duration of the disease.

I.—Not being directly concerned with the object of this paper, the clinical course of the various types of *trachoma* in which the bodies were present at varying intervals will be omitted. On the other hand, the clinical course of the disease will be described which was due to infection from cases of trachoma, this disease simulating trachoma for a time, but differing from it by a shorter and more acute course, and the absence of subsequent conjunctival cicatrization and pannus.

The disease, when communicated, is of a rather acute type, and in the twenty-four cases studied, the so-called trachoma bodies were present for periods varying from two to nine months. In some of the early cases observed, the entire conjunctiva was congested and swollen during the first week, showing slight mucoid secretion and medium-sized follicles in the upper and lower transitional folds. The follicles gradually increased in size and number for the following three weeks, hypertrophy with distinct papules appearing on the tarsal conjunctiva and giving it a sand-like appearance. This condition remained stationary in some cases for several weeks when the process retrograded. The follicles and papules on the upper conjunctiva became absorbed, the hypertrophy disappeared, the congestion diminished, and finally the lower conjunctiva, after exhibiting to a mild degree the sand-like appearance above referred to,

became restored to normal. The usual time required for this resumption of a normal appearance was three or four months, though in one case the time was nine months. In another case of the papillary type, ptosis and hypertrophy, with a papillary appearance of the conjunctiva of the upper and lower lids of one eye, still persist after a year and a half. Only mild therapeutic measures were employed except in those few cases showing no tendency to ameliorate. In two cases with acute manifestations, in which the bodies were present, the inflammation involved only one eye, but showed the same course as the bilateral cases just described. Partial ptosis of one eye was present in two cases which gradually disappeared after several months.

II.—The clinical course of *blennorrhœa neonatorum non-gonorrhœica* was as follows:

In the six cases studied, the bodies were found at periods varying from four days to two weeks after birth. The clinical course of these cases resembles that of mild cases of *blennorrhœa gonorrhœica*, which in its earliest stage is characterized by a diffuse conjunctival congestion with a mucoid secretion from the conjunctiva. This condition remains for about one week, when the conjunctiva assumes a fine papillary appearance, and a few small follicles are seen on the upper fold as well as on the lower. This appearance lasts about two months, when the process regresses simultaneously with the gradual disappearance of the bodies and is followed by a permanent return of the conjunctiva to normal in from three to four months. In one of these cases, the conjunctiva was more congested than in the other five, and a pseudo-membrane was present on both upper conjunctivæ. This patient was taken home after having been in the maternity ward for two weeks; when, three days later, the mother returned with the child, the condition in the child's eye was slightly improved, but in the mother the conjunctiva of one eye was slightly congested, with a few follicles present and a slight mucoid secretion. A conjunctival smear from the mother's affected eye revealed the presence of so-called trachoma bodies, and these were found at intervals for three months. One week after the original involvement of the mother's eye, her other eye—previously normal and free from bodies—became similarly affected. The clinical course



in this case was similar to those observed in the acute manifestations simulating trachoma. The total duration was six months; the cornea remained clear, and the conjunctiva became normal and has remained so up to date.

III.—*Blennorrhœa gonorrhœica in young girls*.—In an epidemic at the Randall's Island Hospital in July, 1910, there were thirty cases of this disease in girls from five to fifteen years of age, twenty of whom are still under observation. After six cases had developed, these and the successive cases were transferred to another ward, until within a few days thirty patients were isolated, all of whom had marked ophthalmia, as evidenced by intense œdema of the lids, pyorrhœa, diffuse congestion, and folding of the conjunctiva and, in a few cases, a necrotic membrane covering the tarsal conjunctiva. In six of the cases, vaginal smears taken at the outset showed the gonococcus, but no bodies. Conjunctival smears in all the cases showed both gonococci and so-called trachoma bodies, but the irregularity of their discovery and the inconstancy of their association were noteworthy. For four months smears were repeatedly taken at intervals of a few days; sometimes gonococci would be found alone, at other times so-called trachoma bodies alone, and occasionally both gonococci and bodies.

Toward the end of the illness the gonococci naturally were less numerous and frequent, but the bodies persisted even after a cure of the gonococcal infection had been practically effected.

One case constituted an exception to the above findings in that gonococci alone were found throughout the course of the disease, though clinically the case was similar to the others. The course of these cases resembles that of blennorrhœa gonorrhœica, as seen in adults, the hypertrophic and papillary stage of which is hardly to be distinguished from trachoma.

After regression from this stage of the disease, in most of the cases the conjunctiva became normal in from three to four months; in several, however, there is still, two and a half years after infection, a slight congestion of the lower conjunctiva and a few granules are present on the tarsal conjunctiva and folds, this persistence being possibly due to a mild reinfection.

Our further observations, as described in this paper, seem to confirm the hypothetical conclusion arrived at two and a



half years ago, that there exists an independent conjunctival affection associated with the trachoma bodies, this affection resembling trachoma with acute manifestations, but not complicated by pannus or cicatrices and their sequelæ. If the disease were trachoma, the usual sequelæ would have developed in at least some of the cases after two and a half years. The assumption that an attenuated trachoma virus might be responsible for this independent conjunctival affection, associated with the trachoma bodies, is hardly tenable, as under such circumstances the bodies should be demonstrable oftener in chronic trachoma than was really the case; for only in thirty-six out of the sixty cases studied, or 60%, were the trachoma bodies detected.

If trachoma can exist in such a mild form that its evolution to complete cure takes place without cicatrization, pannus, or other sequelæ, then our description of trachoma as considered by most ophthalmologists must be somewhat altered.

Blennorrhœa neonatorum non-gonorrhœica, with which the trachoma bodies were also associated, is not trachoma: (1) because in the new-born there is no opportunity for infection except through the genital tract of the mother; (2) because the condition bears no clinical resemblance to trachoma; and (3) because there is spontaneous cure without sequelæ, although in adults, infected from these cases, there are manifestations simulating the acute stage of trachoma, if there be such a stage.

As to blennorrhœa gonorrhœica in young girls, where the bodies were found in conjunction with gonococci, and in some cases of typical trachoma, these conditions are to be interpreted as the result of the disease caused by these bodies becoming engrafted on the original affections.

Finally, absolute proof of the hypothesis that the trachoma bodies are responsible for an independent conjunctival affection will not be forthcoming until a means shall have been discovered of growing these bodies in pure culture. Sufficient evidence has, however, already been adduced that the term "trachoma bodies" is a misnomer and should be discarded.

## ON ACQUIRED RETRACTION MOVEMENTS OF THE EYES.

BY PRIVAT-DOZENT DR. ROBERT SALUS, 1st ASSISTANT, GERMAN EYE  
CLINIC, PRAGUE.

Translated by Dr. ALFRED BRAUN, New York.

THE retraction of the globe into the orbit, on contraction of one or more of the ocular muscles, is one of the rarest symptoms in the domain of the oculomotor apparatus. Heuck, in 1879, appears to have been the first to call attention to such retraction movements, in a case of bilateral congenital ptosis with almost complete immobility of the right eye. There followed many such observations by Stilling, Mac-Lehose, Bahr, Türck, Wolff, and others.

In all of these cases, there was divergent squint, absence of abduction; sometimes adduction was wanting altogether, sometimes it was only limited, and often there was permanent enophthalmos.

The retraction movements always occurred upon attempting to move the eye in, and were, in some cases, combined with a deviation upward or downward.

Türck has given the following explanation for this form of retraction: It can be produced either by the insertion of one of the recti muscles very far back (in the above mentioned cases, the internus), or by fixation of the globe on the temporal side. In the first case, the muscle cannot unroll itself from the globe sufficiently to exercise its normal function, and in the latter case, the eye cannot follow the pull of the antagonistic muscle, and consequently it is pulled backward.

That both these theoretically deduced possibilities really occur, has been proven, partly through operation on such cases, and partly experimentally. Bahr found, in his case,

that the greater part of the rectus internus was inserted 12mm behind the corneal margin, and a second bundle was inserted still farther back. The rectus externus was entirely wanting. Heuck also was able to demonstrate on his patient a marked displacement backward of the insertion, of both the inner and outer recti.

Axenfeld and v. Schürenberg have indirectly given the same cause for their cases, in testing the passive movements of the eyes with forceps. This showed passive movement in the direction of adduction to occur without any resistance, and without retraction, from which we may draw the conclusion that there was no fixation of the globe on the opposite side.

The more common form of retraction seems to be that due to fixation of the globe of the temporal side. In such cases, the external rectus is replaced by a rigid fibrous band, with few or no muscular elements. Inouye was the first to demonstrate this anatomically. Zur Nedden showed in his case considerable resistance to passive adduction with the forceps. Passive abduction was free.

I had the opportunity of observing two similar cases, lately. Birch-Hirschfeld has recently given a collective exposition of the condition in the *Graefe-Saemisch Handbuch*.

This form of retraction, then, is not at all uncommon, *i. e.*, the congenital form, caused by a purely muscular anomaly, either a congenital aplasia of the external rectus, or a far posterior insertion of the internus, which then represents a persistent retractor bulbi.

Much less common are the acquired retraction movements which may be divided into four groups, according to their symptoms and etiology.

The first, comparatively common group, are those cases in which, as the result of inflammatory processes, or injuries of the muscles in the orbit, there occur cicatricial adhesions between them. Usually there is co-existent enophthalmos with restriction of mobility in various directions. This, together with the history, with possible traces of the injury on the skin or eye, or the results of the primary inflammatory process in the orbit, makes the etiology of such a retraction certain.

We saw, only recently, such a case, with marked enoph-

thalmos, and retraction accompanying adduction, which occurred after an acute traumatic orbital phlegmon.

Dippelt reported a case of retraction due to traumatism, in which, after the traumatism, as a result of cicatricial contracture and adhesion between the rectus internus and the sclera, with every attempt at adduction, the globe was drawn back into the orbit.

To the second group belong those cases in which psychic emotions cause reflex contractions of the ocular muscles, with short retraction movements.

In this group belongs a case of Förster's, before the introduction of cocaine, which was reported by Förster's son.

"A retraction of the globe into the orbit, as the result of irritation of the corneal nerves, I have often had the opportunity of observing, especially during removal of foreign bodies from the cornea with the needle or gouge, also during corneal incision for iridectomy or extraction. The retraction was momentary and spasmodic, and was about 2-3mm in extent. Whether the insertion of the lid-retractor had the same effect, I cannot recall. Since the introduction of cocaine, this observation is probably no longer made."

I am sure, however, that cocaine has little to do with the matter, for even now it is not so uncommon at the beginning of a globe operation for the eye, when it is grasped with the fixation forceps, to suddenly draw back into the orbit. This is undoubtedly due to the psychic emotion causing a powerful innervation of the ocular muscles, with a contraction, which, since the eye cannot move in any direction, on account of its fixation, manifests itself in a retraction of the eye.

In a third group, W. Förster's case may be included, although, strictly speaking, it does not really belong here, as the retraction movements are more passive than active. Förster's patient was a very thin, emaciated individual, with deep, sunken eyes. When the lower lid was drawn down, the lid, fornix, and remaining conjunctiva were drawn forward, resulting in a broad, almost horizontal, conjunctival surface, from the edge of the lid to the eye, the eye at the same time sinking back into the orbit. This phenomenon was even more marked when both upper and lower lids were drawn apart together. By drawing either upon the upper or lower lid, alone,



there occurred, with the enophthalmos, a slight turning of the eye, in the opposite direction. Under ordinary conditions, the movements of the globe were normal, but when enophthalmos was produced in the above-mentioned manner, the movements to the right, left, or downward lagged considerably behind those of the other eye, the movement upward being only slightly less. When the eye was grasped with forceps, however, the passive movements were free in every direction. Measured with Fick's tonometer, there was a difference of about 3mm between the positions of the normal and enophthalmic eyes.

The following is the explanation that the author gives for this phenomenon: Where there is so much loss of fat in the orbit, the globe occupies the empty space, by falling back into the orbit. The lids, by deep-drawn folds, replace the fat-cushion which ordinarily separates the globe from the anterior portions of the walls of the orbit. If, now, the lids are drawn apart, and at the same time outwards, the fasciæ which are attached to the lids follow this pull, whereas, with normal conditions in the orbit, this could not happen, as, with a normal position of the globe in the orbital entrance, the fascial attachments are completely relaxed. Through the tension on the fascial sheaths, however, the retrobulbar connective-tissue is also pulled forward, and the globe falls backward into the empty space which is thus formed.

In similarly emaciated individuals, neither Förster nor Birch-Hirschfeld could make out this phenomenon, therefore it seems reasonable to suppose that in the above described case there must have been some peculiarity in the relations of the muscles, or the attachments of the fasciæ, in order to produce the retraction.

The last group of cases of acquired retraction movements differ from the preceding groups, in that the cause lies not in the muscular apparatus nor in abnormal conditions in the orbit, but in the central nervous system.

There has been no mention made in the literature of retraction movements as symptoms or accompaniments of a cerebral affection. Only two cases could I find in which this phenomenon could be assumed to be acquired, in all probability, and in connection with a central disorder. It



seems, therefore, to be a very rare condition, although it may possibly have been overlooked in some cases.

I would like to go over, in detail, the two cases reported by Koerber.

CASE 1.—The patient was a student, 21 years of age, whose trouble began about six years before, without any apparent cause. The vision in the left eye became poor, and the eye turned outward. This condition has increased, and, in addition, there has come a slight diminution in vision in the right eye. Since the last few years, there is diplopia. There is divergent strabismus on the left side, and the left palpebral aperture is somewhat smaller than the right. The diplopia indicates a paresis of the left internal rectus and superior oblique. Especially upon attempting to look upward, there are retraction movements of both eyes, with slight twitching of the orbicularis and *alæ nasi*, in some positions, nystagmus, symmetrical paresis of movement upward, and an indication of paralysis of movements to the right. There are levator paresis, loss of pupillary reflex to light, and weak reaction to convergence and closure of the lids.

The general examination showed only neurasthenia and increased knee-jerks.

Koerber is inclined to consider this, in view of the fact that in cats retraction movements of the globe, as well as loss of the pupillary reflex, can be produced by irritation of the medulla oblongata, "as most likely due to a chronic disease of the medulla or the region between the medulla and the corpora quadrigemina." However, in spite of the patient's statements to the contrary, one cannot help feeling that this is essentially a congenital anomaly.

The supposition of Koerber seems much more probable to me, namely, that the condition is due to a disseminate sclerosis or a chronic polioencephalitis superior.

CASE 2.—The second case reported by Koerber is that of a farmer 48 years of age, who, after recovering from an attack of influenza, had a diplopia, which lasted for two weeks, and then got well spontaneously. There was paresis of several branches of the third nerve, more marked on the right side than on the left, with especial involvement of the superior rectus. When the patient looked upwards, there were marked retraction movements of the eyes, more

marked on the left side than on the right. At the same time, there was a paresis of accommodation, more marked on the right side, and a slight paresis of the right sphincter.

The author believes the above mentioned pareses to be due to the influenza. The retraction movements are due to an abnormally increased innervation of the recti, which occurs when the patient attempts to innervate the markedly paretic elevator of the eye.

We see, therefore, that in both cases, there were multiple incomplete paralyses in both eyes, and that retraction usually occurred when there was an intended movement in the province of one of the markedly paretic muscles.

To these two cases I can add a third case, recently observed, which should put an end to all doubts as to the occurrence of such acquired retraction movements as an accompaniment of cerebral disease.

N. M., a miner, 25 years of age, was brought to me on June 3, 1908, in a somnolent condition. His brother, who accompanied him, stated that the patient was always healthy, as a child. In 1904, he joined the army, but after eight weeks he was released on account of his eyes. What the nature of this trouble was the brother did not know. After leaving the army, the patient worked in a coal mine, until October, 1906. At this time, his present illness began, with frequent attacks of vertigo, during which the patient sometimes fell on the street, always forward. In addition to this, the brother noticed that almost daily the lids of the left eye contracted for a few minutes (on closer questioning, it seems that the condition was one of ptosis). These attacks of vertigo have continued up to the present.

In February, 1908, the patient became sleepy, lay in bed a great deal, and was brought to hospital in B., where, apparently, a tapeworm treatment was undertaken. (A note sent to this hospital was not answered.) After four weeks he was discharged, his apathy continued, and it was noticed that it was necessary to speak to him in a very loud tone of voice, although his hearing was very good. After this, he spoke scarcely nothing, slept continually, and ate occasionally a roll and milk.

For the last nine months he complained of severe headache, mostly in the front and right side. Since 1904, frequent vomiting, severe and sudden, which has persisted up to the present. A moderate drinker. He had gonorrhœa in 1905. He denies lues.

June 3. *Neurological Findings* (Prof. Dr. Margulíés).—On arising the patient sways to the right, and would have fallen had he not been supported. When he walks, being supported on both sides, he sways, first to the left, then to the front, and upon sitting down, again to the right. The patient sits almost continually, with his head bowed forward, almost at right angles. He reacts, scarcely at all, to questions, and must first be shaken out of his apathy. Sometimes he grasps his right temple, which he indicates to be painful.

Upon his entire body, he reacts to a pin-prick. His grasp is equal on both sides, and strong, but it is striking that it takes a considerable length of time until he attains his full strength. His coated tongue deviates to the right, the right labio-facialis is somewhat weaker than the left, both knee-jerks are increased, bilateral ankle-clonus. The character of the plantar reflex is undecided.

Pulse is 60–66, irregular. Pulse-wave flat. During the entire examination, the patient is very dull, and answers questions only now and then. His smell is normal.

*Eye Examination.*—The left palpebral fissure is about 1 mm wider than the right. The left eye is somewhat exophthalmic, and its visual axis is somewhat lower than that of the right eye. Almost complete absence of winking. The eyeballs do not move. The usual position is a slight bilateral adduction. Upon attempting to look in any direction, there is an increase of this convergence, but without any pupillary change. At the same time there is a very marked retraction of both globes, in the form of spasmodic jerking movements, which is evident, not only in the eyes themselves, but also in the orbital fold of the lids. There is no orbicularis-contraction accompanying the retraction. There is no movement of the eyes in any other direction.

The eyes are normal, externally. The pupils are moderately dilated, and react promptly to light. Ophthalmoscopically, there is seen a high degree of choked disk, with a prominence of about 6 D., with apparently marked diminution of the visual acuity. (Fingers at 1 M.) Temperature 36.4° C.

June 5. Patient is much brighter to-day; gives connected answers, complains of his poor vision, and also that he is always sleepy. Facial expression is vacant, apathetic, and rigid. Cutaneous sensibility is intact over the entire body. Sense of position is normal. The motility of both extremities is equal, but the tongue deviates to the right, and the right labio-facialis is weaker than the left. To-day, there is marked ankle-clonus, right; on the left side, slight.



Babinski positive, right; uncertain, left. On walking, there is marked swaying to the right, also during rapid turning. The retraction is unchanged. Exophthalmos, measured with Hertel's exophthalmometer, 15mm, right, and 16mm, left. Left pupil is now somewhat wider; light reaction is good.  $V=0.7$ . Ophthalmoscopic picture is unchanged. There is diplopia, but the statements of the patient are of no value for determining its nature. Pulse 76; X-ray picture, negative.

The history raised the suspicion of the possibility of the presence of a cysticercus, in the region of the fourth ventricle. As this localization did not admit of a radical operation, there was performed by Dr. Rubritius, on the 8th of June, a palliative trepan operation in the left temporal region. A large skin and bone flap was made, exposing a very tense dura. The brain, in the exposed area, was normal. No tumor was palpable. Puncture of the ventricle gave a clear fluid, without pressure; resection of a portion of the bone in the anterior part of the flap; suture of the dura, reposition of the flap, and skin suture. After the operation, the choked disk was unchanged.

In the evening, the temperature was  $37.2^{\circ}$  C., pulse 80, choked disk unchanged, patient somnolent.

June 9. Patient reacts on being asked to show his tongue. But he is somnolent, and does not speak. There is no aphasia. Highest temperature,  $38^{\circ}$ ; pulse good.

June 11. Dressing. Wound is clean, skin flap is pale, slight oedema of the lid, no change in movements of the globe, retraction or choked disk.

June 12. Patient feels easier, and prays without hesitation the paternoster, and repeats difficult words.

June 12, Midnight. Sudden severe tonic and clonic spasms, during which the patient falls out of bed. Bandage is soaked with blood. Cheyne-Stokes breathing. Pulse about 80 and irregular. Bandage was changed. Small hematoma at the posterior edge of the wound. In the course of the night, the spasms were repeated about ten times. They begin with jerking of the thumb and index finger of the right hand, extending to the right platysma, the right sterno-mastoid and facialis, and then the entire right lower extremity, lasting one to two minutes. During the attack, the pupil is dilated and sluggish, the head bent to the right. The attacks are preceded by a short cessation of respiration. In view of the presence of the hematoma, intracranial bleeding was suspected, and the trephine wound was reopened. But everything was found normal. Temperature in the morning was  $37^{\circ}$ , pulse 140, stertorous breathing. Retraction and ophthalmoscopic findings un-

changed. The attacks become shorter and more frequent. Exitus at 2.15.

*Post-mortem* (Prof. Kretz).—U-shaped skin-bone flap in left temporal region. Region of the right orbit slightly suffused, left pupil widely dilated, right pupil moderately dilated. In subdural space, a small amount of fluid blood. The meninges, on the convexity, somewhat pale; in the region of the trephine area, adherent to the dura; and at the base, in the region of the chiasm, slightly cloudy. The convolutions are markedly flattened, the brain substance anæmic, soft, and, in the region of the left temporal lobe, very moist. Numerous hemorrhages in the gray matter. The ventricles are dilated, the left more than the right. The ependyma is slightly granular. There are about 50cc of clear fluid. On opening the fourth ventricle, there is seen a small, thin-walled vesicle, about 5 x 3mm, with one end in the aqueduct.

The fourth ventricle is somewhat dilated. Both tonsils are covered with pus, and the cervical glands are enlarged, reddened, and hemorrhagic.

*Pathologic-anatomical Findings* (Prof. Dr. Margulíes).—On microscopic section there is seen, extending above the floor of the fourth ventricle, dorsally forward into the aqueduct of Sylvius, up to the anterior corpora quadrigemina, a cysticercus of typical structure and appearance. The greatest diameter of the vesicle is seen in sections which pass through the fourth ventricle, directly behind the aqueduct of Sylvius, becomes gradually narrower dorsally, but becomes rapidly narrower ventrally. In the region of greatest circumference, there are seen constrictions (daughter-vesicles). The cysticercus is elliptical in shape, and does not reach the walls or the floor of the ventricle anywhere, and is nowhere in contact with the brain-substance. In some places it seems to be adherent to the pia. The ependyma of the ventricle does not appear to be altered. The aqueduct is widened, but is nowhere completely filled by the cysticercus. The spinal cord below the cysticercus is normal. There were no noticeable changes in the region of the nuclei of the ocular muscles. The nerve-roots are also normal.

Choked disk is an almost constant feature of brain cysticercus. Yet the small size of the vesicle can scarcely cause sufficient increase of intracranial tension to cause this symptom. In this case there could not have been any tension, as puncture of the ventricle brought to light only a few drops of fluid. The cause of the papillitis, in these cases, is probably due to the production of large quantities of toxic materials by the cysticercus.



The disturbances of motility of the ocular muscles, on the other hand, were probably due to direct mechanical pressure on the nuclei, even though no marked anatomical lesions could be found.

If we now consider the retraction movements, we can be sure that they are acquired, for several reasons. In the first place, on account of the condition being bilateral, which is seldom the case in the congenital cases. Furthermore, in the post-mortem, no changes were found in the orbit to account for such disturbances of muscle function. The type of the retraction movements is also different from that seen in the congenital cases. In the latter cases, the retraction usually occurs during adduction, the eye being drawn horizontally inward and backward, whereas here there was a spasmodic series of jerking movements, directly backward, very aptly described by Koerber as "nystagmus-retractorius."

In order to explain this interesting phenomenon, we will recapitulate, briefly, the principal symptoms.

At the height of the disturbance, there was almost complete absence of all ocular movements. On attempting to look in any direction, there was marked retraction with slight adduction of both globes, without contraction of the pupil. There was absence of associated movements, as well as convergence; since, on attempting to converge, there occurred only a slight adduction of both eyes, without the contraction of the pupil which always accompanies convergence. The light-reaction of the pupils was normal.

The retraction movements can only be explained by assuming that the impulse of the will (innervation) to look in any direction flowed into all the ocular muscles, and, as a result of the predominance of the four recti over the obliqui, gave rise to retraction of the eyeballs. The adduction must not be considered to be due to a better innervation of the internal recti, but to the fact that with equal innervation of the four recti, on account of the physiological predominance of the action of the internus, there results a slight adduction.

The seat of the lesion was undoubtedly in the floor of the aqueduct of Sylvius.

In conclusion, I wish to thank my honored chief and teacher,

Prof. Dr. A. Elschmig, for his permission to publish the case, as well as for his constant interest.

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## ON THE CHEMISTRY OF SENILE CATARACT

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RECENTLY, W. Reiss published some interesting findings in cataractous lenses, which he obtained with the aid of a new albumin reaction. This is a red coloration, resulting from the use of sodium-nitro-prusside and ammonia, which was first observed by Heffter with egg-albumin, and could not be obtained with serum-albumin, fibrin, egg-globulin, keratin, or peptone.

Independently of Heffter, Arnold later tested a large number of albuminous bodies with this reaction, and found it to be positive in a series of animal as well as plant albumins. The proteid substance of most of the organs (liver, thymus, muscle) reacted positively, whereas connective tissue (tendons, fascia, cartilage) and the albumin contained in the excretions and secretions (mucin of the saliva, casein of the milk, the albumin of urine) did not give the reaction. The reaction was less strongly marked in the albumin of various plants, and was most strongly marked in the lens of the eye.

Arnold as well as Heffter considers the red coloration to be due to the presence of the cystein group in the albumin molecule, for of all the amino-acids in albumin, cystein alone becomes red with sodium-nitro-prusside and ammonia.

Reiss was able to prove that in the normal lens there was no difference in the behavior of the peripheral and of the central layers with the cystein reaction. In senile cataract the reaction disappears entirely or in part, whereas a traumatic cataract behaves like a normal lens. The red coloration was entirely wanting in hypermature cataract. In mature

cataract, it was absent or present only as the faintest trace in the nucleus, and a trifle more marked in the cortex. In immature cataract, the cortex almost always reacts plainly, and in some cases even the nucleus. The age of the patient had no bearing on the reaction.

I went over Reiss's results, and found them correct. In normal lenses, the reaction was always the same in the nucleus and cortex. I followed the same technique as Reiss, who separated the cortex from the nucleus, and examined each for cystein, rubbing up some of the lens matter on tissue paper with a spatula, and pouring upon this layer a few drops of a 4% sodium-nitro-prusside solution, and then a few drops of ammonia, upon which there resulted an intense red coloration when the reaction was positive.

In five cases of ripe senile cataract examined by me, the nucleus was entirely negative, while the cortex showed a faint pink coloration. In ten cases of immature cataract, the result varied with the stage of the ripeness, there being always a decided difference in the reaction between the more or less opaque nucleus and the clearer cortex. A traumatic cataract showed the reaction with equal intensity in every part of the lens substance.

Whether the three varieties of senile cataract (subcapsular, supra- and intra-nuclear) will show variations in the reaction, will be shown by further investigations. Reiss, in his 60 cataracts, did not specify the variety of senile cataract.

In two non-cataractous, but highly sclerotic and yellowish-brown discolored senile lenses, the reaction was just as strong in the central as in the peripheral portions. I found the same result in an amber-yellow senile cow-lens. The loss of the reaction cannot, therefore, be due to the normal sclerotic change in the nucleus of the lens. It must be due to the cataractous change in the lens-substance.

What this change is, Reiss thinks to be a loss of the cystein group. Whether this loss of the cystein reaction is due to a loss of the cystein group in the albuminous bodies of the diseased lens, or whether it is due to a general diminution of the albuminous content of the cataract (Cahn), or the almost complete absence of albumin in the nucleus (Michel), or to



degenerative fatty changes in the lens-fibres (Toufesco), cannot be said with certainty.

In analogy with the negative result of the reaction in a fatty degenerated liver, in which organ many cystein groups are normally present, Reiss accepts the last mentioned of the above possibilities, namely, that a fatty degeneration of the lens-fibres prevents the reaction in senile cataract.

Arnold, whose investigations Reiss followed, says, in his first work, in mentioning the color-reaction for the lenticular albumin, that he could find no portion of the lens, which is insoluble in water, and Reiss touches on this question when he mentions, parenthetically: "Arnold could not convince himself of the existence of an albumin insoluble in water or neutral salt solution, in the lens."

This is in contradiction to the statement of Mörner, whose work, "The Protein Substances in the Refractive Media of the Eye," 1893, has received universal recognition up to the present. Mörner distinguishes in the lens an albumoid insoluble in water (48% of the total albumin), two soluble globulins,  $\alpha$ -Kristallin and  $\beta$ -Kristallin (19.5% and 32%), and a soluble albumin of which there is only 0.5% present.

Mörner mentions the case of the erroneous assumption of the non-existence of the insoluble albumoid, saying: "Ordinarily, in studying the albumins of the lens, the following method has been followed. The lens, rubbed up with sand, was mixed with water or salt solution, and after filtration all the attention was given to examining the filtrate. The residue, however, was never examined. Yet only half the lens substance is dissolved in the water. The only authors who mention an insoluble portion of the lens are Berzelius and Béchamp."

I was also able to confirm Mörner's statement of the presence of a considerable portion of insoluble albumin in the lens.

In the chemical examination, which was undertaken in the physiological institute, I received considerable help from Privatdozent Dr. Ackermann, whom I wish to take this opportunity of thanking. On his advice, I followed Mörner's directions very closely, analyzing the four albuminous bodies which occur in the lens.

In all, 120 cows' lenses were examined. After removing



the capsule, I rubbed them with fine sea-sand and water into a homogeneous paste, to which I added water gradually, allowed a sediment to settle, and centrifuged, thus removing Mörner's albumoid. This was mixed with water several times, and centrifuged. Whereas, at first, the nitro-prusside-ammonia reaction was present in trace, it disappeared entirely after the repeated washings.

It is therefore determined, that the albumoid of the cow's lens does not give the nitro-prusside reaction.

In the solution which was left after centrifuging away the albumoid, were contained the remaining albumins. In order to obtain the  $\alpha$ -Kristallin, I filtered the fluid through very fine gravel, which removed the remainder of the albumoid, and precipitated the filtrate carefully with 0.1% acetic acid, until there was no more precipitation. This precipitate of  $\alpha$ -Kristallin was isolated by means of the centrifuge, and gave a slight but distinct nitro-prusside reaction. The  $\alpha$ -Kristallin was carefully cleaned by dissolving it in 0.05% ammonia and reprecipitating with 0.01% acetic acid, centrifuging, and the process again repeated. But in spite of this thorough washing there was still a distinct reaction. The reaction with  $\alpha$ -Kristallin is not nearly so marked as with normal lens substance.

To isolate the  $\beta$ -Kristallin, I precipitated a portion of the remaining fluid with alcohol, which was filtered off, and washed with water and alcohol. This precipitate gave an intense purplish red reaction with the sodium-nitro-prusside and ammonia. As this precipitate consists, according to Mörner, almost entirely of  $\beta$ -Kristallin, there being at the most 2% of albumin present, the marked positive reaction is unquestionably due to the  $\beta$ -Kristallin.

In order to settle all question of doubt, I took another portion of the solution which was freed from the albumoid and  $\alpha$ -Kristallin, and obtained the  $\alpha$ -Kristallin free from albumin, by saturating with magnesium-sulphate, and repeatedly washing the precipitate with saturated magnesium-sulphate solution. There still remained the strong positive nitro-prusside reaction.

I was able to confirm the statement of Arnold, that the albumin-free extract of the lens gives the reaction, thus

proving it to contain free cystein. The reaction was positive in a dialysate of lens paste, as well as in the filtrate obtained after precipitating with ammonium-sulphate, this precipitate containing all the lens albumins.

The intensity of the coloration can be increased by adding saturated ammonium-sulphate solution, as well as concentrated magnesium- and sodium-sulphate solutions.

The most interesting point in the entire examination, and for the understanding of senile cataract perhaps the most important, is the complete absence of the nitro-prusside reaction in that albuminous body which is insoluble in water, and constitutes about one half of the entire albumin-content of the normal lens.

It may seem peculiar that the  $\beta$ -Kristallin gives the reaction so much more strongly than  $\alpha$ -Kristallin, yet this might be explained by the greater sulphur-content of the former. According to Mörner, the former contains 1.27%, and the latter only 0.57%. Besides this, the quantity of loosely combined sulphur in  $\beta$ -Kristallin is supposed to be very high. The sulphur-content of albumin is found entirely, or very largely, in the cystins and cysteins in the albumin-molecule. The  $\beta$ -Kristallin in the cows' lenses examined by me gave the sulphur reaction much more intensely than the  $\alpha$ -Kristallin.

In order to obviate the danger of transferring conclusions from one class of animals to the human lens, I performed the same tests on human lenses. Thirty-six normal human lenses were tested in this way. The same results were obtained here.

It remains, then, to bring into harmony the fact of the failure of the reaction in intranuclear senile cataract and in the insoluble albumin (albumoid) of the normal lens. In this connection, older examinations in regard to the chemistry of the cataractous lens are valuable.

In agreement with other authors, Michel and Wagner found the amount of soluble albumin in senile cataract to be diminished. As it is just these forms of albumin, namely,  $\alpha$ -Kristallin and especially  $\beta$ -Kristallin, which give the reaction, and the insoluble albumoid does not give it, the negative result of the nitro-prusside-ammonia reaction in senile cataract is explained very simply by the more or less complete loss of the soluble albuminous material.

Whether there is, here, an increase in the transformation of the Kristallins into the insoluble albumoid, which, according to Mörner occurs physiologically to a certain degree through life, this will be the subject of further quantitative investigations of the albumoid-content of the normal and the senile cataractous lens.

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## HEMIANOPIC PUPILLARY PARALYSIS AND THE HEMIOPIC PRISM PHENOMENON.

By DR. ADOLF JESS, WÜRZBURG.

Abridged Translation from Vol. LXXXI., No. 1, German Edition of these  
ARCHIVES, by Dr. PERCY FRIDENBERG, New York.

WHILE the exact course of the pupillary reflex fibres is still undetermined we may assume that centripetal pupillary fibres do not go beyond the primary optic ganglia; while Bechterew's theory of their decussation directly behind the chiasm into the gray matter on the floor of the third ventricle can no longer be maintained. The pupillary paths certainly traverse the great part of the optic tract and possibly continue on, as Bernheimer's fibres, into the external geniculate body.

The presence of hemianopic pupillary rigidity or hemiopic reaction, which may well be termed hemikinesis (Hess), is of prime importance in the localization of a lesion along the visual paths. Opinions are divided as to the possibility of exactly determining pupillary hemikinesis. Hess noted that not only the light reflected into the interior of the eye but dia-scleral rays as well could cause contraction of the pupil, and being unable to exclude these sources of error, eliminated them by making them constant by means of a simple apparatus and alternate illumination. His conclusion was that the hemianopic pupillary reaction is of no practical importance although it can, theoretically, be elicited. Wilbrand's prism-phenomenon, first suggested in 1899, consists in a compensating movement of the eye when the image of a fixed object is thrown on the blind half of the retina. This was noted in a number of cases which were proven on autopsy to be due to a lesion in the occipital lobe with primary optic centres, oculomotor nuclei,



and paths from globe to primary centres intact, and was lacking in a case of hemianopsia which clinically appeared due to basal luetic meningitis and was accompanied by incipient unilateral optic neuritis and oculomotor disturbances.

Wilbrand describes his procedure as follows: The patient is seated before a blackboard in order to concentrate his attention on a small patch of white paper; the second eye being occluded. A strong abducting prism is now brought suddenly in front of the eye so that the patient no longer sees the object he was fixing. We then note whether the eye makes a compensating motion in the axis of the prism, and whether this motion is reversed when the prism is withdrawn. The prism is to be presented suddenly so that the patient shall not be inclined to follow, consciously, the path of the image on its way from the fovea to the dividing line of the hemianopsia.

Wilbrand explains this reaction by habit which enables the individual to execute exactly the number of eye-movements which are required to move the fovea over the shortest path which will bring it again in contact with the displaced image. The motion has become automatic, almost reflex, although originally, perhaps, under control of conscious will. Wilbrand thinks this phenomenon requires further clinical and anatomical corroboration. Behr (1909) considers this prism test much more exact than the hemiopic pupillary reaction. Behr locates the afferent branch of the postulated reflex-arc in Bernheimer's fibres, which he thinks have about the same course as the pupillary fibres and so concludes that a negative prism reaction requires the presence of hemianopic pupillary rigidity. Behr had a positive reaction in five cases of hemianopsia of evidently intracerebral origin, and negative reaction in all four cases of lesions of tract and chiasm with complete break. Bielschowsky cannot admit any direct transmission of retinal stimulation to the oculomotor apparatus in the absence of light perception. He reports a case of chiasm lesion with amaurosis and optic atrophy in the left, and temporal hemianopsia of the right eye, in which there was prompt abduction on presentation of a prism of  $40^{\circ}$ , base in. The intelligent patient herself explained that she had learned to look to the right for objects which had disappeared from her field of vision, and B. agrees that the eye motion was the



result of experience gathered during the disease. If Behr's premise were correct we should be able to elicit eye motions at will by corresponding retinal irritation in every case of cortical blindness, but this has never been clearly demonstrated. Recently Bielschowsky applied the test repeatedly with invariably negative results in a case in which autopsy confirmed the diagnosis of lesion in both occipital lobes with total blindness and normal pupillary reaction. Krusius reports four negative cases, one of bitemporal hemianopsia with probable hemianopic pupil, due to tumor of the hypophysis, and three of cortical hemianopsia with intact pupillary reaction. Koellner's nine cases of hemianopsia were negative, but the localization was not confirmed by autopsy.<sup>1</sup>

Some years ago Hess suggested the method of alternate illumination, mentioned above. Two lighted surfaces are alternately uncovered so that first the blind and then the seeing half of the retina is exposed while the total amount of light reaching the eye is hardly altered. This eliminates all inaccuracies due to diffused light. The lighted surfaces are first made "iso-kinetic" for a normal eye by so adjusting the illumination that the pupils remain of the same size with alternate illumination or contract to the same degree when exposed to either light. This must be tested separately for each eye, as Hess has shown that the motor excitability of the retina diminishes more rapidly toward the temporal side, and we have also to allow for variation in the quantity of light reflected from surrounding objects, parts of the face, and so on. The observation of the illuminated eye was made at 30cm distance with a telescope magnifying six times. The other eye was covered, so that the direct reaction was tested, not the consensual reaction as in Krusius's cases. In applying the prism test, monocular and binocular examinations were made with prisms varying from 16° to 32°. The test was also reversed; the fixed point being first deflected to the seeing

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<sup>1</sup> Schwarz advised, as a modification of Wilbrand's procedure, to leave the other eye uncovered and to see whether it made any fusion motion when the image of the fixed object was deflected to the blind half of the retina. To this Behr objects that, as only weak prisms can be used in eliciting attempts at fusion, we shall be misled by an unavoidable source of error, viz., the macular preservation.

half of the retina, causing the patient to make a compensating eye-motion for macular fixation. The prism was then quickly withdrawn, causing the image to fall on a blind part of the retina and any "reflex" compensatory fixation noted. By testing in the dark room with two small light sources whose rays entered the eye at angles corresponding to the test with the prism, it was possible to eliminate the inherent source of error attributed to a wandering of the displaced image over the macular reserve as a source of compensating motions, although, as a matter of fact, deflection of a ray by prisms does not cause any apparent motion of the image.

Eight cases from the Wuerzburg clinic are grouped in the following table:

No.	Lesion.	Visual Field.	Clinical Symptoms.	Hemikinesis	Prism Test
1	Sagittal tear completely through chiasm.	Bitemporal hemianopsia with preservation of macula.	Incipient atrophy. R. and L. complicated fracture of base. Diabetes insipid.	Positive.	Negative.
2	Tract lesion (left). Autopsy.	Right homonymous hemianopsia with macular preservation.	Choked disk, R. and L. R. hemiparesis involving R. facial, hypoglossus, and R. trigeminus.	Positive.	Negative.
3	Lesion of L. Optic radiation (occipital tumor). Autopsy.	R. homonymous hemianopsia. Macular preservation.	R. and L. choked disk, in later stage. Optic aphasia. R. paresis of extremities.	Negative.	Negative.
4	Hemorrhage into L. posterior capsule.	R. homonymous hemianopsia. Macular preservation.	Old lues. Apoplectic attack. Paresis of extremities, R.	Negative.	Negative.
5	Embolism central from corp. geniculat.	L. homonymous hemianopsia. Macular preservation.	Cardiac hypertrophy. Contracted kidney. Bilateral hemianopsia, at first.	Negative.	Negative.
6	Embolism central from corp. geniculat.	L. homonymous hemianopsia. Macular preservation.	Photopsies defective halves of retina, at commencement.	Negative.	Negative.
7	Hemorrhage in central course of visual paths.	R. (incomplete) hemianopsia. Macular preservation.	Apoplectic attack. Babinski (R).	Negative.	Negative.
	Porencephalic focus in optic radiation.	R. homonymous hemianopsia. Macular preservation.	Hysteria(?).	Negative.	Negative.

The lessons of these eight case histories may be briefly stated. The first three cases are classical, paradigmatic, for each of the three possible forms of hemianopsia. The lesion was proven to be present in the chiasm, in the tract, and in the occipital lobe, respectively. The findings in these cases can properly be used and the experience applied to the interpretation of symptoms and the localization of lesions in the other cases associated with hemianopsia which were not examined post mortem.

While hemikinesis could be determined beyond a doubt in both cases of lesion of the chiasm and tract, there was no pupillary disturbance of any sort in cases of central lesion.

The five next cases are to be considered as central hemianopsias. In cases 4 and 5, physical examination gave ample support for this diagnosis, while the assumption is justified in all of the cases by the finding of a normal pupillary reaction.

If there were a reflex-arc for involuntary eye-movements analogous to that for the pupillary fibres, as Behr assumes, there would infallibly have been reflex compensatory movements, positive prism test, in every one of the last six cases. The compensation was missing, however, in these cases, as well as in the first two with peripheral lesions. Where any sort of correction or fixation movement could be elicited it was at once seen that the rapidity and accuracy which gave the semblance of reflex movement depended on the intelligence of the patient and on the frequency with which the test was repeated.

Clinical observation confirms the inferences drawn from an analysis of the postulates of the prism phenomenon: Wilbrand's test cannot be used for the topical diagnosis of a hemianopsia.

The reverse is true of the hemianopic pupillary reaction. The presence or absence of this reaction, hemikinesis, disputed by many, and admitted theoretically while denied all practical value by others, must, as determined by the Hess apparatus, be considered in the light of the investigation herewith submitted as a sure diagnostic aid in the localization of cerebral affections.

REPORT OF THE TRANSACTIONS OF THE SECTION  
OF OPHTHALMOLOGY OF THE ROYAL  
SOCIETY OF MEDICINE.

By MR. C. DEVEREUX MARSHALL, LONDON.

The first clinical meeting of the Section was held on Wednesday, Nov. 6th, under the Presidency of Sir ANDERSON CRITCHETT, C.V.O.

Mr. HERBERT FISHER showed a case of **subhyaloid hemorrhage**, with drawing. He urged the abandonment of the term "subhyaloid hemorrhage," as the hemorrhage was intra-retinal; he suggested the words "semilunar retinal hemorrhages." The President agreed with the suggestion.

Mr. A. W. ORMOND showed a case of **pemphigus of the conjunctiva**, followed by essential shrinking. The patient was æt. 24, and as his general condition as well as his sight were now so bad, he pleaded for something to be done. Mr. Ormond proposed to clear away the conjunctiva as much as possible and substitute mucous membrane from elsewhere. Mr. FISHER referred to a case of **pemphigus of the conjunctiva**, which was later under Mr. LAWFORD's care, in which a vaccine made from the contents of the patient's own vesicles was administered for some time, but without marked benefit. Mr. LAWFORD confirmed the fact that there was no definite improvement after the vaccine treatment. Mr. BISHOP HARMAN described a very severe and extensive case, involving larynx, pharynx, mouth, and both eyes, in which no treatment benefited.

Mr. R. GREEVES showed a case of **paralysis of the third nerve with periodic spasm of iridociliary muscles**. He said he could not make out any relationship between the movements of the two eyes. He thought the right pupil



was a little unsteady, but it seemed to have nothing to do with the contractions and dilatations of the other eye. Mr. HERBERT described a somewhat similar case, and suggested an explanation, namely, that a portion of the nucleus of the third nerve was non-existent and the other portion of it was weak, so that it was able to overcome the innervation of the higher centers only after an interval of rest.

Mr. HERBERT PARSONS showed a case of **Mooren's ulcer, with ulceration of the sclerotic**, and Mr. LESLIE PATON demonstrated a **modification of Herbert's operation for chronic glaucoma**, in which his object had been, while retaining the simplicity of Herbert's operation, to procure a more permanent result. Mr. HERBERT described his own attempts in the same direction, emphasizing the importance of not reducing the nutrition of the flap too much. The difficulty arose chiefly in subjects who had very shallow anterior chambers.

Mr. E. NETTLESHIP read notes of a case in which a **sarcoma of the choroid** was seen as a small spot of disease, but its true nature not recognized, about 20 years before the diagnosis of tumor was made, and 25 years before the removal of the eye. The case showed the importance of watching over long periods, when possible, the behavior of certain solitary spots or patches of dusky discoloration that were occasionally seen in the choroid during ophthalmoscopic examination, some of them probably being the beginnings of malignant growth, although others were, no doubt, congenital and stationary. Such solitary, non-inflammatory patches might sometimes be the counterparts of the minute sarcomatous growths, of which nine or ten examples had been accidentally discovered after death and published during the last few years.

Mr. NETTLESHIP read also a joint communication by himself and Mr. A. HUGH THOMPSON on an extensive pedigree of **Leber's disease of the optic nerves**, which illustrated the occurrence of the malady in females, recovery in some cases in both sexes, descent to all the children of one of the affected women, diabetes with blindness of unknown nature in one member, high infantile mortality in the very large family of one affected man, and absence of influence of the optic nerve disease upon prospect of life.

The President paid a tribute to the labors of Mr. Nettle-



ship in the domain of hereditary disease, and referred to the changes of medical opinion on the subject of heredity. Mr. HUGH THOMPSON supplemented the paper in respect to one patient, who was a heavy smoker, and suggested that in cases of tardy recovery from tobacco amblyopia enquiry should be made as to any connection with Leber's disease.

Mr. A. W. ORMOND read a paper on a **case of retino-choroiditis juxta-papillaris**. The patient was a man *æt.* 20, who found, on awakening, that he could not see very well with his right eye. He had had a little pain in the eye a week previously. On examination there were found keratitis punctata, and a patch of acute choroiditis touching the upper margin of the optic disk, and spreading upwards. Edema of the retina spread over and beyond the patch. Vessels which passed over the inflamed area were partly obscured, and the arteries diminished in size; there was also some haze in the vitreous. Von Pirquet's reaction was positive. The inflammation gradually subsided, and the patient now had full visual acuteness, but a large sector of his field of vision, stretching from the blind spot to the extreme periphery, was entirely absent, and he had no perception of light in this area. The defective area in the field of vision was clearly due to the obliteration of a branch of the central retinal artery by the pressure of the inflammatory swelling. Under the title "Retino-choroiditis juxta-papillaris" Professor Jensen, of Copenhagen, published four similar cases in *von Graefe's Archiv*, in 1909.

## QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY

By H. KÖLLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMEL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mainz; DANIS, Brussels; GILBERT, Munich; GRÖNHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUTLER, Dresden; and VISSER, Amsterdam.

FIRST QUARTER, 1912.

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

### I.—GENERAL OPHTHALMIC LITERATURE. Reviewed by WESSELY.

(Books, Monographs, and Historical Essays.)

1. EVERSUSCH. *The eye diseases of childhood*. Leipsic, 1912.
2. SALZER. *The diagnosis and the errors in diagnosis of diseases of the brain from the papilla nervi optici*. Lehmann, Munich.
3. WECHSELMANN. *Treatment of syphilis with "606."* Vol. ii., Berlin.

EVERSUSCH'S (1, *The eye diseases of childhood*) book forms a part of Pfaundler and Schlossmann's large work on children's diseases, and although it is primarily intended for the general practitioner and pediatricist, it is almost a complete text-book on ophthalmology, in which is recorded the author's personal experience as well as his own opinion concerning all important therapeutic questions; it may be read with great interest by ophthalmologists. He begins with a description of the congenital abnormalities, together with an account of the anatomical and physiological development of the eye of the child, and then deals with the diseases of the different parts of the eye. The work is richly illustrated.

SALZER (2, *The diagnosis and the errors in diagnosis of*

diseases of the brain from the papilla) describes in a little appendix to Weygandt's *Atlas of Psychiatry* the physiological varieties of the papilla which have to be taken into account and cause difficulties in the differential diagnosis of commencing atrophy, or of commencing choked disk. Although not much that is new is presented, the article tends to make clear the limits within which a diagnosis can be made with the ophthalmoscope alone without the aid of an accurate functional examination. Two plates illustrate the most important types of physiological variations and congenital anomalies, together with the doubtful and certainly pathological conditions of the papilla.

The portion of this book which is of special interest to ophthalmologists is that which deals with recurrence in the nervous system, which WECHSELMANN (3, **Treatment of syphilis with "606"**) saw in only about  $\frac{1}{3}\%$  of the cases. He is not inclined to blame salvarsan for this, because it is slow in development and is curable by renewed injections of the preparation. He speaks of the diseases of the optic nerve that appear before the outbreak of the secondary symptoms, and of the treatment of tabes and paralysis. In the former the results were uniformly negative; in the latter he often saw such improvement, both subjective and objective, that he treats every patient with tabes with salvarsan, but very carefully so as to avoid any reaction, using small doses, 0.1 to 0.3 either subcutaneously or intravenously.

## II.—RELATIONS OF OPHTHALMIC TO GENERAL DISEASES, INCLUDING POISONS. Reviewed by WESSELY.

4. BERNHEIMER. Indicanuria and diseases of the eye. *Wiener klin. Wochenschrift*, No. 11, p. 410.
5. STUELPE. Is indicanuria a frequent cause of diseases of the eye? *Arch. f. Ophthalmologie*, lxxx., 3.
6. v. HIPPEL, E. Indicanuria in diseases of the eye. *Ibid.*, lxxxi., 1.
7. HIRSCHBERG. Methyl-alcohol poisoning. *Berl. klin. Wochenschrift*, No. 6, p. 247.
8. MENDEL. Visual disturbances caused by methyl alcohol. *Zentralbl. f. Augenheilkunde*, p. 43.
9. OHLEMANN. Methyl alcohol. *Wochenschr. f. Therapie u. Hygiene d. Auges*, Nos. 16 and 19.
10. VALUDE. Ocular and auditory troubles following the use of hectine. *Annales d'oculistique*, cxlvi., p. 272.

11. IGRSHEIMER. Injuries of the eye by chrysarobin. *Muenchener med. Wochenschrift*, p. 728.
12. PEARCE, F. H., RANKINE, R., and ORMOND, A. W. Notes on 28 cases of Mongolian imbeciles; with special reference to their ocular conditions. *British Medical Journal*, 1910, vol. ii.
13. GROVES, E. W. H., and JOLL, CECIL. Thyreoid grafting and the surgical treatment of exophthalmic goitre. *Ibid.*, vol. ii., p. 1965.
14. KOELLNER. Hereditarily syphilitic fundus in a family of seven children. *Med. Klinik*, p. 422.
15. AUBINEAU and CIVEL. Palpebral tumor and paralysis of the sixth nerve in Recklinghausen's disease. *Arch. d' ophtalm.*, xxxi., p. 808.
16. SALUS. Erythema exudativum multiforme in the eye. *Klin. Monatsbl. f. Augenheilkunde*, Jan.
17. CUPERUS. A case of erythromelalgia and disease of the eye. *Nederl. Tydschrift voor Geneeskunde*, vol. i., p. 5.
18. LAGRANGE. A Case of uræmic amaurosis in a pregnant woman. *Archives d'ophtalmologie*, xxxi., p. 675.

Autointoxication as the cause of diseases of the eye occupies to-day the forefront of interest. Since E. v. Hippel opposed Elschnig's view that autointoxication plays a part in the development of sympathetic ophthalmia, as well as of chronic iridocyclitis, of which indicanuria is a symptom, several articles have appeared on the subject.

BERNHEIMER (4, **Indicanuria and diseases of the eye**) has made accurate observations concerning the indican in the urine of 308 stationary cases and obtained 31 positive results. But these are divided almost uniformly over the most various diseases of the eye, and the ratio scarcely exceeds 10%, either in retrobulbar neuritis (47 cases with 5 positive results) or in iridocyclitis (34 cases with 5 positive). Bernheimer therefore, agrees with v. Hippel that indicanuria is not of importance in diseases of the eye, and also that it is not generally pathognomonic of intestinal intoxication.

STUELPEL (5, **Is indicanuria a frequent cause of diseases of the eye?**) comes to almost the same result. In 1000 cases of diseases of the eye, including both such as were thought by Elschnig to be frequently caused by autointoxication and others, in which no such connection has been claimed, he found an abnormally high amount of indican in the urine in about 8% of the cases divided quite uniformly through all the groups of disease. The same percentage was obtained from an examination of 50 patients who had no eye disease. Quite



independently therefore of the question whether indicanuria is or is not pathognomonic of the presence of autointoxication he cannot find it of importance in the etiology of diseases of the eye.

In the same way E. v. HIPPEL (6, **Indicanuria in diseases of the eye**) found indicanuria in only 16 out of 416 cases, less than 4%, and these uniformly divided among the most various diseases of the eye.

Several articles deal with the cases of methyl-alcohol poisoning in Berlin. HIRSCHBERG (7, **Methyl-alcohol poisoning**) gives a historical account of our knowledge of blindness following the drinking of methyl alcohol, which reaches back seventy years, during which time individual cases were reported. Many cases due to the adulteration of liquor with methyl alcohol were observed in America and Hungary until finally sufficient material accumulated in literature so that now this is the form of poisoning to be suspected in cases characterized by vomiting, pain in the stomach and head, deafness, widely dilated pupils, the onset of total blindness, and, in the worst cases, of death.

MENDEL (8, **Visual disturbances caused by methyl-alcohol poisoning**) says that of 130 patients who entered one of the hospitals in Berlin suffering from methyl-alcohol poisoning 58 died, subsequently to becoming totally blind. In these cases the pupils were widely dilated and without reaction, the retinal vessels were greatly engorged, in some optic neuritis and choked disk were present. In the patients who survived and complained at first of visual trouble, the vision gradually returned. In these cases also the retinal vessels were engorged, while in some the pupils were immobile, and in others reacted slowly. In four patients a high degree of amblyopia or amaurosis persisted together with atrophy of the optic nerve.

OHLEMANN (9, **Methyl alcohol**) believes that the most certain point of differential diagnosis between botulismus and methyl-alcohol poisoning is the loss of consciousness in the latter.

VALUDE (10, **Ocular and auditory troubles following the use of hectine**) reports the case of a tabetic who was treated for the second time with ol. ciner. on account of an oculomotor paresis and had received a year previously 10 injections of 10



or 20cgr. of hectine. At that time only transient visual troubles were caused. The renewed treatment resulted in total loss of the peripheral visual field and of the hearing. The latter was regained somewhat, but the former went on to total blindness. It was not until after six months that a commencing atrophy of the optic nerve could be made out ophthalmoscopically. Valude warns against the use of this remedy in patients who already suffer from troubles with the optic or auditory nerves.

CAUSÉ.

IGERSHEIMER (11, *Injuries of the eye by chrysarobin*) remarks the photophobia in cases of chrysarobin conjunctivitis, and finds that there is always an involvement of the cornea in the form of superficial punctate opacities. This chrysarobin keratitis usually recovers in a few days. He thinks the origin is partly ectogenic, partly from the remedy absorbed into the skin.

A large number of defects were noted by PEARCE, RANKINE, and ORMOND (12, *Notes on 28 cases of Mongolian imbeciles*) such as squint and nystagmus, but especially a particular form of cataract. This consisted of small dots in the cortex nearer the anterior than the posterior surface, to be seen only by focal light. In the more marked cases the opacity consisted of two layers enclosing a clear nucleus, the posterior being concave forwards, the anterior flat and situated about midway between the center of the nucleus and the anterior lens surface. A star-shaped opacity was seen at the posterior pole of the cataract and sometimes at the anterior pole. Some may therefore be termed lamellar and others congenital "dot" cataracts. There is no evidence at present as to whether the condition is stationary or progressive.

A. H. PAYAN DAWNAY.

GROVES AND JOLL (13, *Thyreoid grafting and the surgical treatment of exophthalmic goitre*) record a case of Graves's disease of twelve months' duration in which the symptoms were relieved for only ten days by removal of the right lobe and isthmus. Six months later the patient a girl, 19 years old, had a small piece of thyreoid with two parathyreoids implanted under the left sternomastoid; this was followed by a severe attack of tetany which subsided and the general condition

improved. The duration of the improvement remains to be seen.

A. H. PAYAN DAWNAY.

KOELLNER (14, **Hereditarily syphilitic fundus in a family of 7 children**) found, corresponding to the better or worse general condition, in one only depigmentation of the pigment epithelium and slight thickenings of the walls of the chorioidal vessels, in the others a high degree of sclerosis of all the chorioidal vessels together with secondary symptoms. Wassermann's reaction was negative in all the children.

AUBINEAU and CIVEL (16, **Palpebral tumor and paralysis of the sixth nerve in Recklinghausen's disease**) observed in a man 33 years old, suffering from Recklinghausen's disease, a large tumor of the left upper lid and a paresis of the abducens. The latter was probably caused by an intracranial tumor. The tumor of the lid, with a larger one at the root of the nose, was the first localization of the disease. In addition the patient had about 60 little tumors and pigment spots of the skin. The tumor of the lid, as well as one from the skin, showed histologically a fibromatous nature, with a great abundance of cells and typical changes of the nerves and of the numerous sweat glands.

CAUSÉ.

SALUS (16, **Erythema exudativum multiforme in the eye**) describes two cases of very severe croupous conjunctivitis with negative bacteriological findings, which he conceives to be a local manifestation of an erythema exudativum vesiculosum because of an analogous disease that affected the mucous membrane of the mouth at the same time.

In a case of erythromelalgia of the right leg that had lasted 5 years, CUPERUS (17, **A case of erythromelalgia and disease of the eye**) saw a similar clinical picture develop in the right eye with marked inflammatory symptoms and pain which was especially great at night. The keratitis underwent involution after ten days, the entire attack after six weeks. He considers the disease to be a vasomotor neurosis and that the prognosis is good.

B. P. VISSER.

LAGRANGE (18, **A case of uræmic amaurosis in a pregnant woman**) reports the following case. The patient had had total blindness of both eyes for 14 days in the second month of

a pregnancy two years before, but no examination of the urine was made at that time. She suddenly became so blind in the seventh month of her last pregnancy that she could not go about alone. The urine was very albuminous and the patient was taken into the hospital on account of the danger of eclampsia, but the pregnancy continued to full term. Eight days after delivery, after she had been blind for two months and a half, the vision began to return gradually until that of each eye equalled 1. The ophthalmoscopic condition then was normal, but the field was greatly contracted, central vision alone being preserved. The defect of the visual field was permanent; the urine was free from albumin at the last examination. Albuminuric retinitis, retrobulbar neuritis, hysterical amaurosis, and simulation were excluded. The nature, pathogenesis, and symptomatology of uræmic amaurosis need further investigation. It is the consequence of an arterial hypertension with a local vascular spasm which interferes with the nutrition of the cortical visual centers. The preservation of the function of the macula alone can be explained by the theory that each macula has a bilateral center in the anterior part of the calcarine fissure. CAUSÉ.

### III.—GENERAL AND EXPERIMENTAL PATHOLOGY AND TREATMENT. Reviewed by LOEHLEIN.

19. AUGSTEIN. Studies of pigment on the living eye. *Klin. Monatsbl. f. Augenheilkunde*, Jan., 1912, p. 1.
20. VAN DER HOEVE. Lenticular opacities produced by naphthol. *Nederl. Tydschrift v. Geneesk.*, 1912, vol. i., No. 5.
21. IGERSCHEIMER. Experimental studies of the action of salvarsan on the eye. *Muench. med. Wochenschrift*, 1912, p. 729.
22. MARX. The latency of bacteria in the injured eye. *Archiv f. Ophthalmologie*, 80, 3.

AUGSTEIN (19, Studies of pigment on the living eye) says that the pigmentations on the surface of the eye are not congenital as they have been supposed to be,—for example, the pigment about the scleral veins,—but develop during the first year of life. These physiological pigmentations often increase after inflammations of the uvea. Pathological pigmentations in the anterior segment of the eye are usually due to the escape of the coloring matter of the blood from traumatism, but only when pigment cells are present; this is true not only



of the cases in which the increase of the pigment cells can be explained by the nature of the trauma, but also of others, in which the author thinks a wandering of the pigment cells to the surface takes place much more frequently than has been supposed.

VAN DER HOEVE (20, **Lenticular opacities produced by naphthol**) introduced into the stomach of a pregnant rabbit three doses of 1g per kilo of  $\beta$ -naphthol. All five baby rabbits had perinuclear cataracts which were more or less well marked.

B. P. VISSER.

IGERSHEIMER (21, **Experimental studies of the action of salvarsan on the eye**) finds that chronic salvarsan poisoning produces changes in the medullary sheaths of the optic nerve in cats.

MARX (22, **The latency of bacteria in the injured eye**) introduced very small quantities of staphylococcus aureus, streptococci, and pneumococci into the vitreous of rabbits. In half of the cases he obtained living germs from the eye after the lapse of months, but a true latency, *i. e.*, vitality of the bacteria found when the inflammatory symptoms had completely passed away, in only six. Yet these positive cases confirm the theory that it is uncertain in any given case in which infection has been present in an eye and the inflammatory symptoms have undergone involution whether germs which retain their vitality still exist in it or not. Hence if inflammation recurs in an eye which has apparently recovered from an infected wound it may be caused by the same agents that were originally introduced, which have been in a latent condition.

#### IV.—METHODS OF RESEARCH, REMEDIES, INSTRUMENTS, AND GENERAL OPERATIVE TECHNIQUE. Reviewed by LOEHLEIN.

23. COHEN. Salvarsan and the eye. *Deutsche med. Wochenschrift*, p. 626.

24. PITZMAN, M. The antiseptic and germicidal properties of the silver salts and preparations. *Amer. Jour. of Ophthalm.*, Jan., 1912.

25. EWING, A. E. Argyrosis. *Amer. Jour. of Ophthalm.*, April, 1912.

26. RYERSON, G. S. On the use of radium in ophthalmology. *Ophthalmology*, Jan., 1912.

27. MCKEE, H. A new method of making film preparations to demonstrate the presence of the gonococcus. *Ophthalm. Record*, Jan., 1912.



28. EHRHARDT, ANNA. **A new lid clamp.** *Amer. Jour. of Ophthalm.*, Feb., 1912.

COHEN (23, **Salvarsan and the eye**) observed an optic neuritis set in two months after an injection of salvarsan and lead almost to blindness. He ascribes the trouble to the remedy, because gray ointment and potassic iodide were without effect. In another case an iritis was made worse.

PITZMAN (24, **The antiseptic and germicidal properties of the silver salts and preparations**) shows by tabulating the results of his experiments what effects are produced by combinations of silver nitrate and bichloride of mercury with blood serum in different dilutions. It appears that the germicidal action takes place only when the albumin is insufficient to satisfy the affinity of the chemical salt. Thus, if the albumin is diluted one quarter it takes only one quarter the mercury or silver to cause the solution to be germicidal. Mercury albuminate shows no sign of antiseptic action, but when the affinity for albumin is satisfied the excess of bichloride is powerfully germicidal. Silver albuminate shows definite antiseptic action, and when strong the free nitrate acts as a germicide. Collargol and argyrol are without excess of the silver salt, but are antiseptic, while protargol, ichthargan, albargin, and novargan are strong germicides because they contain free nitrate of silver.

ALLING.

EWING (25, **Argyrosis**) relates cases of ulceration of the cornea which were stained by the continued use of argyrol. In each case the stain was found to affect only the portion which healed first, where the capillaries were formed, as the elastic fibres are particularly susceptible. He had the opportunity to study two fresh specimens of argyrosis, one in which the tissue had been discolored as the result of the rupture of the lachrymal sac during the injection of argyrol, the other a case of conjunctival and subconjunctival staining. In the latter the vessels and lymph spaces of the papillæ were deeply stained, while the blood-vessels were wholly blackened. Black and brown masses were also distributed through the adenoid layer. The elastic fibres, Meibomian glands, muscles, and fat were affected. The white blood cells seem to take part

in distributing the pigment. There were many discolored fat cells showing fatty acid like agglomerated crystals.

ALLING.

RYERSON (26, **On the use of radium in ophthalmology**) discusses the physical properties of radium and its physiological action upon the eye. Therapeutically it acts only upon the external structures, being more or less effective in such conditions as rodent ulcer, angioma, and epithelioma of the lid. A sarcoma of the eyebrow was cured by its application. It gives fairly good results in trachoma and vernal catarrh. Sixteen out of seventeen corneal ulcers responded rapidly.

ALLING.

MCKEE (27, **A new method of making film preparations to demonstrate the presence of the gonococcus**) recommends the Giemsa stain as especially useful in demonstrating pneumococci or gonococci when present in the epithelial cells.

ALLING.

The instrument invented by EHRHARDT (28, **A new lid clamp**) is used in the resection of the tarsus and consists of a clamp with a plate on one arm and a serrated edge on the other. The latter part is applied to the conjunctival side of the lid and tightly secured by means of a set screw.

ALLING.

V.—ANATOMY, EMBRYOLOGY, MALFORMATIONS. Reviewed by PAGENSTECHER.

29. COSMETTATOS. **The development of the iris and the formation of the anterior chamber in man.** *Arch. d'ophthalm.*, xxxi., p. 655.

30. BECKER, HERMANN. **Cases of anophthalmus congenitus monolateralis.** *Muenchener med. Wochenschrift*, 1912, No. 14, p. 782.

COSMETTATOS (29, **The development of the iris and the formation of the anterior chamber**) says that after the lens has separated from the outer epithelium at the end of the second month the space between the lens and the cornea becomes filled with the mesodermal tissue surrounding the secondary optic vesicle. In the third month this divides into an anterior and a posterior layer: the former grows fast to the cornea and becomes Descemet's membrane with endothelium; the latter forms the pupillary membrane. The latter is about as thick as the cornea, but tapers off toward the center,

and especially toward the lens. An opening between the cornea and the pupillary membrane is to be seen at this time, which is to be regarded as the first rudiment of the anterior chamber. During the fourth month this gradually enlarges and the first differentiation of the tissue into the endothelium of the cornea and the base of the pupillary membrane is to be seen in the sinus of the chamber. The other parts of the membrane undergo involution. In this stage a notable change is to be seen in the anterior part of the secondary optic vesicle, a thickening of the pigmented portion, the first rudiment of the ciliary body. The development advances in the fifth month, the retinal pigment layer of the iris is formed through the anterior part of the optic vesicle; the sinus annularis is to be seen distinctly. The retinal layer of the iris is covered by the pupillary membrane, which now becomes somewhat thickened again to form the mesenchym of the iris. Instead of the oval form it has hitherto preserved, the anterior chamber assumes an angular shape. In the sixth month the iris measures  $\frac{1}{2}mm$ ; both of its layers are strongly pigmented, and the circular fibres of the sphincter pupillæ can be distinguished. The system of the sclero-corneal trabeculæ can be differentiated in the sinus of the chamber. In the seventh month the iris is  $1mm$  long, the sphincter is well developed. The eighth month brings no notable advance, in the ninth the iris is completed, and a thread-like trace of the pupillary membrane hangs from the pupillary margin into the anterior chamber; as a rule, this has disappeared at the time of birth.

CAUSÉ.

BECKER (30, **Cases of anophthalmus congenitus monolateralis**) reports two cases of congenital anophthalmus. One was characterized by atrophy of the entire right side of the face, arrested development of the right forearm, with absence of the radius, of six carpal bones, and of the right thumb. The right eye was totally absent, the orbit was funnel-shaped, shallow, and lined with mucous membrane. Microblepharia was present. The second case was one of microphthalmus and anophthalmus congenitus. An opacity of the cornea could be seen in the microphthalmic eye, which cleared up somewhat after birth, as well as a coloboma of the iris. The fourth and fifth toes of the left foot were grown together.



## VI.—PHYSIOLOGY OF NUTRITION AND INTRAOCULAR TENSION. Reviewed by WESSELY.

31. WESSELY. Contribution to the study of the intraocular change of fluid and of the tension of the eye. *Sitzungsbericht d. Phys-med. Gesellschaft*, Wuerzburg.

32. ROLLET and CURTIL. Studies of ocular tonometry. *Revue générale d'ophtalmologie*, xxx., p. 481.

WESSELY (31, Contribution to the study of the intraocular change of fluid and of the tension of the eye) induced glaucoma with deep anterior chamber, complete occlusion of the sinus of the chamber, and buphthalmic enlargement of the eye in new-born rabbits by discission of the lens and then instituted filtration experiments. These showed that filtration from the eye was totally abolished. Apparently complete seclusion of the pupil, on the contrary, always proved permeable to the current of filtration. Peripheral iridectomy brought the buphthalmic growth to a standstill. The experiment demonstrates anew the importance of the sinus of the anterior chamber as the principal efferent passage.

Further evidence was obtained of the dependence of the intraocular tension upon the blood pressure. Exceptions occur only when the change of blood pressure is due to a change in the caliber of the peripheral vessels. Thus amyl nitrite, caffeine, or antipyrin causes a rise of the intraocular tension even when the blood pressure is low. Such drugs may therefore occasionally take part in the excitation of an attack of glaucoma. Wessely warns against ascribing too great importance to the absolute values found with Schioetz's tonometer. The instrument is gauged on the cadaveric eye and a test at different times after death gives very different values.

ROLLET and CURTIL (32, Studies of ocular tonometry) have tested the action of various drugs upon the tension of the normal eye by means of measurements with Schioetz's tonometer. The first measurement was made five minutes after the instillation of the drug, and then every five minutes until the return of the tension to normal. Any change in the size of the pupil was noted at the same time. A tension between 18 and 25mm of mercury was assumed to be normal. Holo-cain has no influence upon the tension or the size of the pupil,



its anæsthetic effect is weak and of short duration. Cocaine causes a slight hypertension with a more lasting dilatation of the pupil. Tropacocain and acoin resemble holocain in their effect, while alypin has a distinct hypertensive property. Stovain, novacain, and eucain B cause a transient burning, but the latter only increases the tension. Atropine results in a prompt and marked hypertension, especially in an eye in which the tension is below normal, the dilatation of the pupil begins five minutes after the instillation. Eupphthalmin increases the tension markedly, while duboisin does not affect the tension at all, and scopolamin very little. The dilatation of the pupil is very slow and incomplete with both of the latter drugs. Pilocarpine does not reduce the tension of the normal eye, eserine reduces it very slightly. The latter is considerably more powerful than the former in the glaucomatous eye. Dionin does not modify the tension. Adrenalin often has an immediate marked, hypotensive action, especially upon an inflamed eye.

CAUSÉ.

## VII.—PHYSIOLOGY AND PATHOLOGY OF THE SENSE OF SIGHT.

Reviewed by KÖLLNER.

33. MONTGOMERY. A simple method for the study of entoptic phenomena. *Journal of Philosophy*, ix., p. 204.

34. VOGT. Experimental studies concerning the permeability of the transparent media of the eye to the ultra-red of artificial light. *Archiv f. Ophthalmologie*, lxxxi., 1, p. 155.

35. STEPHENSON, SYDNEY. On cases of night blindness with peculiar conjunctival changes of children. *The Ophthalmoscope*, Jan.—March, 1912.

36. WILTON. Color sensation. *The Ophthalmoscope*, Jan.—March, 1912.

37. LOHMANN. The theoretic importance of certain phenomena of color pathology. *Zeitsch. f. Sinnesphysiol.*, xlv., 3, p. 129.

38. BOURLAND. A case of ophthalmic migraine. *Ann. d'oculistique*, cxlvii., p. 114.

39. ZENTMAYER, WM. A case of migraine with ring scotoma. *Annals of Ophthalmology*, April, 1912.

40. OVIO. The cyclopic image in the plane mirror. *Archives d'ophtal.*, xxxi., p. 710.

MONTGOMERY (33, A simple method for the study of entoptic phenomena) hangs little silvered balls on threads before each eye in a spectacle frame, so that they form images on

various places of the retina. In this way the reflex movements of the pupils can be observed and measured.

VOGT (34, **The permeability of the transparent media of the eye to the ultra-red of artificial light**) comes to the following conclusions: Only such ultra-red rays can pass through the refracting media as come from white-hot bodies; scarcely any from red-hot bodies, and none from bodies with less heat can pass. The abundant ultra-red rays of the electric light reach the retina in far greater numbers than the visible rays. Such ultra-red rays can be absorbed previously only by very thick layers of water. The harm done to the macula lutea by blinding by the sun may likewise be ascribed to the ultra-red rays. Artificial lights, especially electric, emit far more of these rays than are contained in natural light; hence it is possible that many diseases of the eye are promoted by artificial light. These rays are also to be taken into account in glassblowers' cataract, for they reach the lens in greater numbers than other rays, are densest in the posterior part of the lens, and are absorbed more by the lens than by the other media. The assumption is incorrect that the limit in the spectrum between ultra-red and visible red coincides with the limits of diathermancy of the media of the eye.

In children with conjunctival xerosis but not proven night blindness STEPHENSON (35, **On cases of night blindness with peculiar conjunctival changes of children**) frequently observed a contraction of the visual fields for red and green, less constantly for white. The fundus appears pale, the reflexes are increased. Careful examination shows that the children, although they may appear healthy at first glance, are strumous. He thinks the cause of the disease to be a slight disturbance of nutrition, which can be recognized from a reduction of the hæmoglobin and a change in the color index of the blood.

GILBERT.

WILTON (36, **Color sensation**) reports the case of a hypermetropic woman 45 years old to whom the test letters appeared to be colored blue and yellow up to the distance of  $\frac{2}{3}$  of a meter. This phenomenon disappeared as soon as the hypermetropia was corrected.

GILBERT.

LOHMANN (37, **The theoretic importance of certain phe-**

**nomena of color pathology**) confirms the observation made by v. Reuss that the zigzag lines in scintillating scotoma appear in the complementary colors when the patient looks through a colored glass. According to Reuss the complementary colors are seen with the most difficulty when looking through a green glass, but Lohmann says it is when a red glass is used. In a patient with color hearing there was no blending of the two colors when diphthongs were pronounced, but they were perceived separately, with the exception of the umlauts o and u, when a mixed color was seen; for example, o = yellow, e = red, ö = orange. Probably the audible perception of the two elements plays a part in the separate vision of colors, and the audible mixture of sounds in the other case produces a mixture of colors.

BOURLAND (38, **A case of ophthalmic migraine**) observed in a soldier who suffered from hemicrania the rare form of scintillating scotoma which is localized in the upper portions of the visual fields. The patient recognized the onset of the attack, which was otherwise typical, from the appearance of two dark spots in his visual field.

ZENTMAYER'S (39, **A case of migraine with ring scotoma**) patient suffered from attacks of migraine associated with hemianopsia. There was a temporary negative ring scotoma  $10^{\circ}$  in width situated between the limits of the form and red fields and concentric with them. The observations were made between attacks. It might be explained as a vasomotor disturbance in the vessels which assume an arched form about the macula.

ALLING.

OVIO (40, **The cyclopic image in the plane mirror**) pictures a physiological optical phenomenon that has not been described before, which he denominates the cyclopic image in the plane mirror. If one fixes a point in a plane mirror 1 meter distant without focussing on the true image, an image with three eyes appears first and then an upright cyclopic image. He constructs this phenomenon from the diplopia which arises from the fact that the eyes are accommodated not upon the image but upon the mirror, which is situated only half as far away from the observer, and a double image of the face is formed, the inner portions of which partially cover each other.

The lateral portions are then excluded by psychic abstraction, so that the image seems to have but one eye.

CAUSÉ.

VIII.—ACCOMMODATION AND REFRACTION. Reviewed by  
KÖLLNER.

41. HOWE. The crystalline lens as figured in the text-books and as seen in the eye. *Ophthalmology*, 1912, p. 160.

42. HEGNER. A new system of glasses for the correction of monolateral aphakia. *Klin. Monatsbl. f. Augenheilkunde*, 1., 3, p. 273.

43. KOSTER. Stereoscopy in the vision of astigmatics. *Festschrift to Hector Treub*. Leiden, 1912.

According to HOWE (41, The crystalline lens as figured in the text-books and as seen in the eye) the descriptions given of the form and position of the lens, especially during accommodation, are not correct. Measurements made with Javal's ophthalmometer show: (1) that the anterior end of the axis of the lens is usually displaced a little to the temporal side and somewhat downward; (2) that during accommodation the lens moves slightly downwards; (3) that the posterior surface changes little during accommodation, while the anterior surface arches so that its middle part becomes almost conical. These facts have been determined by measurements, and are not the results of theoretical calculations.

HEGNER (42, A new system of glasses for the correction of monolateral aphakia) reports the results he has obtained by the correction of monolateral aphakia with v. Rohr's system of glasses. These glasses give with full correction of the aphakic eye a size of the image corresponding to that of emmetropia, so that binocular vision can be maintained. The system of glasses is contained in an aluminum capsule 1.5cm broad; its weight is not much greater than that of the ordinary cataract glass. In two cases the glasses were worn with comfort and gave a good stereoscopic vision.

KOSTER (43, Stereoscopy in the vision of astigmatics) thinks that the usual explanation of the metamorphopsia in astigmatics with correcting glasses does not suffice, particularly not for the false stereoscopy, which can only be explained by unlikeness of the retinal images in the two eyes. The nodal points of the different meridians cannot fall together



after the most accurate correction of astigmatism. The image in the corrected weaker meridian is somewhat the larger. The distortion of the image which ensues is exactly the opposite of that in the uncorrected eye and has its greatest value in a symmetrically oblique position of the principal meridians. The disappearance of the false stereoscopy during the wearing of a glass is not to be explained by a nativistic theory.

B. P. VISSER.

IX.—THE MOTOR APPARATUS OF THE EYES. Reviewed  
by KÖLLNER.

44. BYRNE. On the physiology of the semicircular canals and their relation to seasickness. New York, I. T. Dougherty.

45. UFFENORDE. The reaction of the ocular muscles to labyrinthine irritation. *Berl. klin. Wochenschrift*, p. 671.

46. STIRLING. Some unusual cases of nystagmus. *Ophthalmoscope*, Jan.—March, 1912.

47. ELLIOT. A case of voluntary nystagmus. *Ibid.*, Jan.—March, 1912.

48. INOUE. A remarkable case of paresis of the inferior oblique. *Klin. Monatsbl. f. Augenheilkunde*, 1., 2, p. 218.

49. BRADBURN. Hereditary ophthalmoplegia in five generations. *The Ophthalmological Soc. of the United Kingdom*, Jan. 25, 1912.

50. POSEY. A case of congenital ptosis. *Ophthalm. Record*, p. 155.

51. VERREY. A case of unilateral mydriasis of dental origin. *Annales d'oculistique*, cxlvii, p. 188.

52. LEMPP. Further studies concerning the position of rest of the eyeball. *Inaugural Dissertation*, Berlin.

53. DIMMER. The operative treatment of strabismus. *Wiener klin. Wochenschrift*, xxv., No. 1.

54. SCHOEN. A case of vertical strabismus of 120 years ago, according to the observations of the patient, and one of to-day. *Muenchener med. Wochenschrift*, No. 7, p. 361.

BYRNE (44, On the physiology of the semicircular canals and their relation to seasickness) deals with the physiology of the vestibular apparatus, its relations to the ocular muscles, as well as the influence of the cerebrum and cerebellum, from the point of view of the etiology of seasickness, taking into account the experimental studies that have been made concerning its thermic, mechanical, and electrical excitation. The nystagmus that is caused by rotations is a co-ordinated movement which is excited through labyrinthine pressure that acts upon centers situated in and about the middle lobe of

the cerebellum. The excitable organs in the ampullæ of the semicircular canals have intimate relations with definitely defined portions of the cerebellum, *e. g.*, the right and left horizontal semicircular canals are connected with the centers situated to the right and left near the pyramid of the middle lobe. With the aid of these relations and the corresponding nystagmus it is possible to localize lesions in the peripheral vestibular apparatus and in the cerebellum.

According to UFFENORDE (45, **The reaction of the ocular muscles to labyrinthine irritation**) the caloric test of the reaction of the ocular muscles from the labyrinth is the most valuable method. When the result is negative it must be taken into consideration that the action of cold may be weakened by granulations. The compression symptom does not depend on an uninjured membranous labyrinth; when the labyrinth has been totally destroyed and it can be demonstrated that the nerves of the ampulla no longer react, a reaction can still be excited by pressure upon the trunk of the vestibular nerve. In the galvanic excitation of the labyrinth the condition is not one of cataphoretic action upon the endolymph, but one of a direct nerve stimulation, for the reaction can still be excited when the membranous labyrinth has been completely destroyed.

STIRLING (46, **Some unusual cases of nystagmus**) reports a case of voluntary nystagmus, one of nystagmus with tremor of the head, one of albinism with nystagmus and persistent foramen ovale, and two of almost albinotic girls with amblyopia, but not nystagmus.

GILBERT.

ELLIOT (47, **A case of voluntary nystagmus**) also reports a case of binocular horizontal oscillatory nystagmus in a man 30 years old, who had been able to produce it from early childhood.

GILBERT.

INOUE (48, **A remarkable case of paresis of the inferior oblique**) analyses a case of vertical double images of an atypical character, leaving it open whether inferior rectus of the left eye or the inferior oblique of the right eye was paretic. The change in the vertical distance of the double images in inclination of the head to the right and left favors a paresis of the right inferior oblique. The explanation is to be sought in a

spastic contraction of the antagonist, the superior oblique, which still prevails after recovery from the paresis. The visual field also indicates a motor disturbance of the right eye.

BRADBURN (49, **Hereditary ophthalmoplegia**) observed ptosis with almost total loss of the ocular movements in five generations. The explanation given is that of a muscular anomaly. The question of atavism is thoroughly discussed.

POSEY (50, **A case of congenital ptosis**) reports the case of a boy on whom he had performed successfully a Panas operation for congenital ptosis. The operation has the advantage that the amount of correction desired may be accurately gauged.

GILBERT.

The late cutting of a wisdom tooth in a woman 34 years old caused mydriasis and severe neuralgic pains in the affected side of the face, as VERREY (51, **A case of unilateral mydriasis of dental origin**) reports. According to the statement of the patient, the pupil first became large at the time the tooth appeared and the mydriasis promptly disappeared as soon as the tooth was extracted. The accommodation was perfectly normal. He thinks it a spastic mydriasis from a reflex excitation of the sympathetic.

LEMP (52, **Position of rest of the eyeball**) finds orthophoria to be only one of the physiological positions of rest of the eyeball from a study of 425 persons. He found it present in only 25½%, while esophoria could be demonstrated in 40½%, and exophoria in 34%. The refraction exerts only a slight influence, exophoria is rather more frequent in myopia, esophoria in hypermetropia. As age advances esophoria seems to decrease in frequency, while exophoria increases. Perhaps the explanation of this phenomenon may be that the early degenerative changes thought demonstrable in the ocular muscles are usually first noticeable in the internal rectus.

DIMMER (53, **The operative treatment of strabismus**) prefers the double advancement of Landolt to other methods, especially to tenotomy. After-treatment consists of six or seven days of rest in bed and bandage with atropine, followed by stereoscopic exercises with accurate correction with glasses. He does not consider that the position obtained need be absolutely accurate, for this will be cared for later by the tendency to fusion. The operation can be performed at the



age of from 4 to 6 years when conservative treatment has failed.

SCHOEN (54, **Vertical strabismus**) refers to the careful observations made by a patient on himself 120 years ago, which portray troubles that coincide, in his opinion, with those produced by vertical strabismus. He then reports two cases of considerable and obstinate vertical strabismus in whom a considerable improvement of general neurasthenic troubles was gradually obtained by its correction, and two milder cases in which prism correction gave prompt relief.

#### X.—LIDS. Reviewed by KRAUSS.

55. CAVARA. The use of radium in epithelioma of the lids. *Annales d'oculistique*, cxlvi., p. 256.

56. ELSCHNIG. Anomalies in the form of the palpebral fissure. *Klin. Monatsbl. f. Augenheilkunde*, Jan., 1912, p. 17.

57. ELEUTHERIADES. Combined tarsoleptinsis. A radical operation for trachomatous entropion and trichiasis. *Arch. d'ophthalm.*, xxxi., p. 716.

58. FERGUS. Ptosis operations. *Ophthalmic Review*, xxxi., p. 33.

59. HILDESHEIMER. Herpes zoster ophthalmicus gangrænosus. *Zentralbl. f. prakt. Augenheilkunde*, March, 1912, p. 77.

60. KNOEFFELMACHER. Vaccination pustules on the eyelids. *Muenchener med. Wochenschrift*, xiv., p. 789.

61. KUMAGAI. The fate of a flap of cartilage from the ear used in a plastic operation on the lids. *Klin. Monatsbl. f. Augenheilkunde*, Feb., 1912, p. 168.

62. MORAX and LANDRIEU. Hyaline degeneration of the submucous tissue. *Klin. Monatsbl. f. Augenheilkunde*, March, 1912, p. 340.

CAVARA (55, **Use of radium in epithelioma of the lids**) had had very good results from the use of radium in the treatment of epithelioma of the lids, but the sittings must be long and the rays used in large quantities. A perfect result can be obtained from radium alone even when the epithelioma is large and grave. It is important that the apparatus employed should have a powerful action; the particles of radium should not be movable in the instrument; it is best that they should be cemented fast. The "harder" rays prove the most efficient. The sittings should be from one to three hours long. A harmful effect on the eye is impossible in shorter irradiations; in the longer it is easy to protect the eye by a proper direction of the rays. Short sittings of from 5 to 30 minutes are very useful in small superficial epitheliomata. In many cases,



when it is desired to act upon the deeper layers of the tumor, partial radiation is to be recommended, *i. e.*, to have the weaker rays excluded by the interposition of a metal plate. A rapid and positive effect is obtained if the superficial layers are shaved off before the application of the rays. Radium therapy is indicated in all cases in which the orbit has not been invaded and the eyeball is not involved. It has the same indications as, and many advantages over, surgical intervention. Cavara says nothing in regard to recurrences because his cases have been under observation too short a time.

#### CAUSÉ.

ELSCHNIG (56, **Anomalies in the form of the palpebral fissure**) deals in the first part of his work with blepharophimosis, epicanthus lateralis, and entropion, in the second with abnormal length of the palpebral fissure. After a brief review of the theories, in which ankyloblepharon and blepharophimosis have been erroneously confused, the author describes the various occurrences which may lead to a shortening of the palpebral fissure without abnormal adhesion of the margins of the lids, for which alone the name ankyloblepharon should be reserved. The first form is met with in old people with a senile condition of the skin; the palpebral fissure is shortened horizontally, the outer commissure may reach to or beyond the margin of the cornea, while otherwise the configuration of the lid is quite normal. Blepharospasm is present only when this condition is developed to a high degree. Tension on the skin of the temple brings the outer commissure back to its right position. This true blepharophimosis is almost always bilateral. Its cause is a relaxation of the outer palpebral ligament, or of the fascia tarso-orbitalis; blepharospasm is an aiding factor. A similar condition is transiently present with every strong closure of the lids when either the external canthus alone is moved inward, or the adjacent skin of the temple is moved with it so as to overlies the canthus. Both of these are to be seen in an extreme degree in tic convulsif in which entropion of both lids may also be present. This true blepharophimosis may be observed as a transient anomaly in blepharospasm and is prevented from becoming stationary by the elasticity of the palpebral ligament alone. Two other forms

of true blepharophimosis occur in trachoma in young people, usually associated with entropion. The second form is incurable, that caused by a cicatrix. Elschnig distinguishes blepharophimosis vera senilis, spastica, or cicatricea from epicanthus lateralis congenitus or spasticus, in which the temporal skin of the lid is drawn in a fold over the outer canthus. This is caused exclusively by a spasmodic contraction of the orbicularis, which is also apt to cause entropion. Elschnig gives three possible causes for this entropion. One is the effort to keep the lids open while the spasm of the orbicularis shoves the loose skin of the lid over the margin of the tarsus into the palpebral fissure. The second is the cicatricial shortening of the conjunctiva and tarsus in the region of the Meibomian glands, which produces entropion without aid from the orbicularis, while the third is a combination of these two factors. He explains a congenitally too long palpebral fissure by the supposition that when the latter opened in embryonal life the dehiscence was of too great an extent, so that the lids are opened too wide in proportion to the size of the globe and of the orbit, or that from the start the rudiments of the lids were not proportioned to the size of the globe. There is no special clinical importance to this rare anomaly.

LELUTHERIADES (57, **Combined tarsopleptinsis**) recommends an operation which he calls combined tarsopleptinsis for the treatment of trachomatous entropion and trichiasis. After an incision and extirpation of a flap containing skin and muscle he lays bare the margin of the tarsus next the margin of the lid, shortens it about 1 or  $1\frac{1}{2}mm$  and thins the surface. Then the edge of the lid and the lower margin of the tarsus is joined to the upper skin of the lid by sutures introduced in the intramarginal portion and tied above. The procedure is simple and has given good results. CAUSÉ.

FERGUS (58, **Ptosis operations**) recommends the following procedure: Incision through the skin parallel to the free margin of the lid, a second curved one above; removal of the strip of skin thus marked out: suturing of a piece of the tarsus to the fascia of the occipitofrontalis. The operation is unsuited only for those cases in which the occipitofrontalis is congenitally absent or imperfectly developed. GILBERT.

IN HILDESHEIMER'S (59, **Herpes zoster ophthalmicus grænosus**) case, while the lesions on the eyeball healed, numerous gangrenous eruptions appeared over the entire left side of the face and spread over the bridge of the nose beyond the middle line to the brow on the other side. Anæsthesia dolorosa was also present.

KNOEFFELMACHER'S (60, **Vaccination pustules on the eyelids**) patient had been vaccinated 11 days before and had transmitted the lymph to the eyelids, where it had given rise to pustules which were almost simultaneous with those on the arm. The diagnosis was confirmed by inoculation of the cornea of a rabbit. No immunity was produced by the vaccination on the cornea, but anaphylaxis was produced as shown by a reaction to re-inoculation 24 hours later.

KUMAGAI (61, **The fate of a flap of cartilage from the ear used in a plastic operation on the lids**) had the opportunity to examine histologically a piece of the cartilage of the ear used as a flap five months after the operation. In addition to the great atrophy he found two changes: one the resorption of the cartilage cells, probably caused by vacuolization of the protoplasm and hyalinogenous degeneration of the intracellular substance of the cartilage; the other the entrance of new bands of connective tissue from the surrounding tissue into that of the cartilage, probably by way of the rows of cartilage cells.

MORAX and LANDRIEU (62, **Hyaline degeneration of the submucous tissue**) describe a case of hyaline degeneration of the submucous tissue of the eyelids met with in a patient 60 years old. When the lids were everted large brownish hypertrophies of irregular form were to be seen in the conjunctivæ of the tarsus and transition folds. These were cut away. The bacteriological examination was fruitless, but the histological examination confirmed the diagnosis. The epithelium was preserved over the diseased zone, at the margin of which ossification could be perceived; the connective-tissue elements were degenerated, softened, and structureless; deep in the tissue were hyaline masses, some giant cells, and a few plasma cells. The vessels were normal.

#### XI.—LACHRYMAL ORGANS. Reviewed by KRAUSS.

63. LUEDDE. **Gummatous inflammation at the inner canthus simulating dacryocystitis.** *Amer. Jour. of Ophthalmology*, Jan., 1912.



64. CHASE, E. P. *Puncta lachrymalia multiplicata*. *Ophthalmology*, April, 1912.

65. TOTI. The results of rhinostomy of the lachrymal sac (dacryocystorhinostomy). *Zeitschr. f. Augenheilk.*, xxvii., 2, p. 115.

An abscess at the inner canthus of the left eye was incised by LUEDDE (63, **Gummatous inflammation at the inner canthus simulating dacryocystitis**). Irrigation showed that the passages were free. The condition was not improved by the operation, but recovery finally was secured by the administration of large doses of potassium iodide.

GILBERT.

CHASE (64, **Puncta lachrymalia multiplicata**) found three separate puncta in the right lower lid; one occupying the usual position, another 2mm nearer the inner canthus, and the third 3mm internal to this. All opened into the canaliculus.

ALLING.

TOTI (65, **Results of dacryocystorhinostomy**) has performed this operation on over seventy cases in the past seven years. Mishaps have been due chiefly to an erroneous choice of cases and faulty knowledge of the technique, so he again presents his views. The operation should be performed in the majority of cases under local anæsthesia, produced by the external injection of novocain and adrenalin, and internal applications of cocaine and adrenalin, the latter to be made immediately after the external injection. A subsequent application is never needed if the above rule is followed. A hook-shaped, small chisel, with a very short angular hook and straight edge, is very useful for the removal of splintered pieces of bone clinging to the periosteum deep in the wound, or for the resection of such ethmoidal cells as may come in the way. It is used by drawing it from behind forward. An artificial elevation of the nasal mucous membrane for resection by means of the little finger or probe is not usually necessary, for it is sufficiently elevated and fixed by the tampon of cocaine and adrenalin previously introduced into the middle meatus. Resection of the nasal mucous membrane with a sharp spoon is not to be recommended. The first incision is made with a knife at the anterior margin of the piece of mucous membrane to be resected, the edge of which is then seized with forceps and incised below, above, and finally behind either with a



curved knife or with scissors. A double armed suture is used, introduced from within outward so as to join as much as possible of the deep tissues to little of the skin. One at least of the central sutures must join the periosteum of the temporal flap of soft tissue close to the anterior margin of the outer wall of the sac, in order to fix the latter as far forward as possible. If the position of the sutures is marked out the day before operation their rapid and exact introduction is facilitated. No pains should be spared to maintain a fine, exact line of sutures. A treatment *per secundam*, with complete or partial tamponade, is very rarely indicated; at least it becomes less and less indicated as the experience of the operator increases. Any unnecessary irritation or manipulation in the nose is to be avoided. The temporary tamponade of the nasal cavity during the operation is superfluous if the adrenalin has been properly used. The omission of the tamponade of the middle meatus after the operation is without disadvantage in some cases and may in the future perhaps be considered advantageous. Before the application of the dressing, sterile zinc ointment is applied to the sutures, the rima palpebralis, and the entire region of the orbit. The eye may be looked at at the end of 24 hours without pain, bleeding, or disturbance of the wound. In applying the dressing sufficient pressure should be made with protection of the eye. This is best done by pressing with the left forefinger the flap of soft tissue against the bony opening plainly to be felt behind it so that the anterior wall of the sac sinks as deeply as possible into it; the forefinger is then replaced by a rather hard ball of sterile cotton over which is placed a flat piece of gauze. A fairly firm bandage is then applied. This procedure also serves to check any interstitial bleeding. The keloid elevation of the scar, which appears in some cases for unknown reasons a few weeks after the operation, is temporary. In the worst cases it disappears in the course of six months, leaving the scar practically invisible. The test of the result by the passing of probes or irrigation is superfluous. Strict proof of ideal healing may be obtained by the fluorescein test, or by the chemical reaction of chloride of iron and salicylate of sodium. The former is simply instilled in the conjunctival sac; for the latter test a soft piece of cotton is wet with the fluid and in-

troduced into the anterior part of the middle meatus, when the blue violet stain is characteristic. In some cases the mouth of the canaliculus is visible rhinoscopically through the new opening.

XII.—ORBITS, INCLUDING EXOPHTHALMOS, ACCESSORY SINUSES. Reviewed by KRAUSS.

66. POST, M. H. Exophthalmos from a bony tumor growing from the nasal wall of the left orbit. *Amer. Jour. Ophthalmology*, Feb., 1912.

67. POSEY, W. C. Small round-cell myosarcoma of orbit with extension into the eyeball. *Ophthalmic Record*, Feb., 1912.

68. BAUMGARTEN. Visual disturbances caused by affections in the nose. *Monatschr. f. Ohrenheilk. u. Laryngo-Rhinologie*, 1911, vi., p. 633.

69. COOPER. A peculiar-colored reaction on opening Tenon's capsule. *Ophthalmoscope*, Jan.-March, 1912.

70. GUTMANN. Diseases of the orbit after extraction of teeth. *Zentralbl. f. prakt. Augenheilkunde*, March, 1912.

71. KOELLNER. Enophthalmus traumaticus. *Med. Klinik*, 1912, p. 422.

72. MARTIN, H. H. Thrombosis of the cavernous sinus with report of a case. *Ophthalmology*, Jan., 1912.

73. PIFFL. Retrobulbar neuritis due to disease of the accessory sinuses. *Zeitschr. f. Ohrenheilk. u. f. d. Krankh. d. Luftwege*, 1911, iii., p. 231.

74. POSEY, W. C. Circumscribed orbital oedema from frontal sinusitis. *Annals of Ophthalmology*, April, 1912.

75. TERRIEN. Retro-ocular cyst and pseudomicrophthalmia. *Arch. d'ophtalmologie*, xxxi., p. 787.

76. VASQUEZ-BARRIERE. Voluntary exophthalmos in a case of dermoid cyst of the orbit. *Klin. Monatsbl. f. Augenheilkunde*, March, 1912.

77. WEIDEMANN. A contribution to the knowledge concerning ptosis adiposa, together with a case of spontaneous prolapse of the lachrymal gland. *Inaugural Dissertation*, Koenigsberg, 1911.

78. WERTHEIM. The importance, diagnosis, and treatment of empyemata of the accessory sinuses. *Med. Klinik*, 1912, No. 11, p. 431.

The tumor operated on by POST (66, **Exophthalmos from a bony tumor growing from the nasal wall of the left orbit**) when examined by Alt was found to be a dilatation of the ethmoid cells filled with bloody mucus and presenting in the orbit.

A fifteen-year-old girl was seen by POSEY (67, **Small round-cell myosarcoma of orbit**), who gave a history of having developed an orbital cellulitis at one year of age, which gradually

subsided without the appearance of pus, leaving the eye slightly prominent. Two months before the examination the eye again became prominent, but no mass could be felt. A Kroenlein operation was performed and several nodular masses were removed together with the eyeball. The microscope showed the tumor to be composed of muscle fibres more or less inflamed and a small round-cell infiltration resembling sarcoma. The eyeball showed the vortex veins, as well as the ciliary body, to be filled with sarcoma cells. The pathologist regarded the growth as having originated in the blood-vessels and classified it among the endothelial neoplasms of the flat sarcoma type. ALLING.

BAUMGARTEN (68, **Visual disturbances caused by affections in the nose**) gives the clinical histories of four cases in which visual disturbances were caused by affections in the nose and relieved by rhinological intervention. When empyemata of the accessory sinuses are present in such cases they should be subjected to immediate and radical treatment, but intervention may be needed when such conditions are absent, as in a case of a large bulla ethmoidalis, or a great hypertrophy of the middle turbinate. Even minor changes in the nose should be rectified as thoroughly as possible when suspicion arises that they are the causes of eye disease. The author states that he has obtained brilliant results in this manner in a large number of cases, in acute neuritis, chronic papillitis, and retrobulbar neuritis. The rapid disappearance of the color scotoma was particularly marked in all. In one patient with blindness due to acute optic neuritis the latter underwent complete involution and recovered perfectly in a few days after treatment of an acute purulent ethmoiditis. The author believes that the rhinological treatment of these troubles, even when decoloration of the papilla has begun, opens up a fruitful field.

When COOPER (69, **A peculiar-colored reaction on opening Tenon's capsule**) opened Tenon's capsule he saw the entire field of operation assume a beautiful blue color. Possibly it was due to the presence of a soluble salt of the iron cyanogen group which changed its color on exposure to the air.

GUTMANN (70, **Diseases of the orbit after extraction of teeth**) reports three cases of this nature, two of which were

fatal. In the first case an abscess developed by way of the lymphatics in the right orbit and right frontal sinus from the infected socket of the right upper molar, which resulted in septic thrombosis of both cavernous sinuses, abscess in the left orbit, and death from meningitis and general sepsis. In the second case germs from the infected socket of the left upper incisor entered the circulation and caused septic thrombosis of the veins of the left orbit, which extended to the cavernous sinus. Death. A number of incisions were made along the margin of the orbit deep into the cellular tissue; traces of pus were obtained by some, none by others, but an extensive venous engorgement was evident. In the third case the extraction of the third from the last upper molar tooth was followed by an empyema of the antrum of Highmore which was cured through an opening in the canine fossa. The fundus exhibited the picture of a postneuritic optic atrophy, the cause of which was supposed to be an involvement of the upper wall of the antrum and of the optic canal in the suppurative process.

KOELLNER (71, **Enophthalmus traumaticus**) reports two cases of traumatic enophthalmos in which the Roentgenographs and the clinical condition showed a fracture to be present in the outer wall of the orbit at the point where the lateral radiation of the fasciæ of the ocular muscles was attached to the bone. The enophthalmos was moderate, the mobility of the eyes in all directions only slightly limited. Probably the cause of the enophthalmos lay in the enlargement of the space in the orbit by the depressed fracture and a tearing off of the attachment of the fascia.

MARTIN'S (72, **Thrombosis of the cavernous sinus**) case showed the usual symptoms—exophthalmos, dilated pupil, conjunctival oedema, paralysis of the external muscles, and dilatation of the veins. Later the second eye was affected and death followed. The origin of the infection appears to have been a furuncle in the nose. ALLING.

PIFFL (73, **Retrobulbar neuritis due to disease of the accessory sinuses**) reports three cases of this nature, and tells of the results obtained by the coöperation of the ophthalmic and oto-rhinologic clinics in Prague. 824 patients were examined together, almost 5% of the 12,000 eye cases. A positive rhinological condition was present in 583 of these,



chiefly diseases of the nasal mucous membrane, anomalies of the nasal septum, and diseases of the accessory sinuses. Nasal trouble was present in 30 out of 37 cases of retrobulbar neuritis, and of these seven had disease of the accessory sinuses.

POSEY'S (74, **Circumscribed orbital œdema from frontal sinusitis**) patient had prominence and pain of the right eye and a mass under the supraorbital rim on the temporal side. The outward and upward movements of the eye were restricted. The fundus was normal, except for dilated veins, and the field of vision showed only an enlargement of the blind spot. He had had nasal symptoms for ten years and a diagnosis of congestion of the frontal and ethmoidal sinuses had been made. A few drops of pus were evacuated from the orbital mass, which was considered an inflammatory œdema secondary to sinus infection.

ALLING.

TERRIEN (75, **Retro-ocular cyst and pseudomicrophthalmia**) gives the pathological examination of a case which was taken at first to be a microphthalmos, but proved to be a congenital retrobulbar cyst of the optic nerve. The patient was a girl 8 years old. The enucleation was performed because of exophthalmos that had existed since birth. The cyst was attached to the posterior part of the eye, with which it had a common wall, and exceeded the latter considerably in size. It had developed not at the cost of the capsule of the globe, but within the optic nerve. The eye itself had an almost normal size and structure. The optic nerve and the layer of nerve fibres of the retina were wanting. The place of the papilla could be plainly seen as the retrobulbar cyst had developed a process in the situation of the optic nerve. The outer wall of the cyst was formed of a tissue similar to sclera and was lined with long connective-tissue cells.

CAUSÉ.

VASQUEZ-BARRIERE (76, **Voluntary exophthalmos in a case of dermoid cyst of the orbit**) describes a case in which the patient was able to make pressure by strong contraction of the muscles of mastication upon a dermoid cyst that lay partly in the infratemporal fossa, partly in the orbit, so as to force its fluid contents into the orbital portion and so cause exophthalmos, diplopia, and a tumor-like swelling in the outer half of the lower lid and at the outer canthus. The eye was otherwise perfectly normal.

WEIDEMANN (77, **Ptosis adiposa**) gives the following conclusions: (1) Ptosis adiposa consists essentially of a displacement of fat into the lid, either as a hernia, or as a prolapse. (2) No unobjectionable observation has yet been made of symmetrical fatty tumors in the lids. (3) There are two forms: one the consequence or accompanying symptom of the pathological process underlying the blepharochalasis, *i.e.*, this can either encroach upon the septum orbitale or be confined to the lid alone. When the encroachment of the process upon the septum can be excluded there may perhaps be a congenital weakness of the septum orbitale, and the second form of ptosis adiposa may arise from this cause. (4) The spontaneous sinking of the lachrymal gland is to be primarily ascribed to the following two etiological factors, both in uncomplicated blepharochalasis and in ptosis adiposa: (a) the process underlying the blepharochalasis involves the connective tissue that holds the gland in place, causes it to atrophy and so to relax; (b) a congenital weakness of the connective tissue of the orbit. In addition to this the traction upon the gland by the prolapsed adherent fatty tissue in ptosis adiposa aids, and several causal factors may work together.

WERTHEIM (78, **Importance, diagnosis, and treatment of empyemata of the accessory sinuses**) has found empyema of the accessory sinuses in 10% of all the diseases of the throat, nose, and ear treated by him. Chronic empyemata cause the greatest variety of eye affections, and therefore it is very important that their treatment should be considered from the standpoint of the ophthalmologist. Among the serious eye complications are cellulitis of the orbit, abscess of the orbit, and retrobulbar neuritis. Latent empyemata of the accessory sinuses, which run their courses without symptoms, or without notable disturbances, may give rise to very serious eye diseases and often an exploratory opening of these cavities is indicated, especially in cases of orbital abscess. All diseases of the nose and of their accessory sinuses deserve in this connection far more attention than has hitherto been accorded them.

### XIII.—CONJUNCTIVA. Reviewed by WOLFRUM.

79. LOEHLEIN. **Clinical and experimental contribution to the question of the importance of the epithelial inclusions found in the eye.** *Arch. f. Augenheilk.*, lxx., p. 392.

80. v. HUNSEL. Treatment of trachoma with sunlight. *Geneskundig Tijdschrift von Nederl.* Indie, 1911, No. 6.

81. ROESSLER, F. Treatment of trachoma with carbonic acid snow. *Wiener klin. Wochenschrift*, 1912, No. 2.

82. STRAUB, M. Treatment and prophylaxis of ophthalmia neonatorum. *Festschrift Hector Treub.*, 1912.

83. ADAM and WAETZOLD. Conjunctivitis tuberculosa (Parinaud's disease). *Arch. f. Ophthalmologie*, lxxxi., p. 228.

84. DEUTSCHMANN, F. Plasmon, the hyaline and amyloid degeneration of the conjunctiva. *Zeitschr. f. Augenheilkunde*, iii., p. 242.

LOEHLEIN (79, Importance of epithelial inclusions) thinks that the cell inclusions in the inclusion disease of infants may be looked upon as the agent with a certain degree of probability. But the fact that the inclusions are frequently very sparse in trachoma of adults, are often absent indeed, as well as the fact that they are wanting in experimental inoculation, contraindicates their etiological importance in trachoma.

v. HUNSEL (80, Treatment of trachoma with sunlight) obtained good results in 80 patients by means of daily irradiation for  $\frac{1}{2}$  to 1 minute with the direct rays of the sun, associated with the weekly application of the copper stick. Without this last the result was not attained, at least not within from three to five months. Complications were observed in only four cases, while patients with acute trachoma or complications were not treated. Papillary trachoma gave the best results.

B. P. VISSER.

The treatment of trachoma with carbonic acid snow affords no advantage over the ordinary methods of treatment, with nitrate of silver, expression, and copper stick, according to ROESSLER (81, Treatment of trachoma with carbonic acid snow). The recovery is no quicker and the cicatrization is greater.

STRAUB (82, Treatment and prophylaxis of ophthalmia neonatorum) recommends, instead of Crede's method, cleansing of the eyes of new-born infants with a 0.1% solution of potassium permanganate.

B. P. VISSER.

ADAM and WAETZOLD (83, Conjunctivitis tuberculosa) studied clinically and experimentally a case of this nature. Tubercle bacilli were found in only one place in the sections,

while experimental inoculations of rabbits and guinea-pigs produced typical tuberculous changes. Whether the tuberculosis was of the bovine or human type could not be determined.

DEUTSCHMANN (84, **Plasmon**) observed a plasmon of the conjunctiva of the upper lid. It was composed of plasma cells, the origin of which, in his opinion, was from the connective tissue cells. In addition to the formation of plasma cells hyaline and amyloid degeneration was met with.

#### XIV.—CORNEA AND SCLERA. Reviewed by WOLFRUM.

85. EPPENSTEIN, A. **The vertically oval form of the cornea.** *Zeitsch. f. Augenheilkunde*, March, 1912.

86. MAGITOT. **The possibility of preserving the human cornea for a long time in a living condition.** *Berl. klin. Wochens.*, No. 10, p. 470.

87. METAFUNE. **Studies of epithelial inclusions in the normal and diseased cornea.** *Annal. d'oculistique*, 146, p. 251.

88. REBER, W. **A case of hyaline degeneration of the cornea.** *Ophthalmic Record*, Dec., 1911.

89. CHARLES, J. W. **Serpiginous ulcer. Complete involvement of cornea. Recovery under mixed vaccines and urotropin.** *Amer. Jour. of Ophthalmology*, May, 1912.

From the study of the form of 100 corneæ, 50 of persons suffering from hereditary syphilis, 50 of normal persons, EPPENSTEIN (85, **The vertically oval form of the cornea**) concludes that the vertically oval form may occur as an anomaly of development, but may also be caused by a disproportion between the firmness of the cornea and the intra-ocular pressure. An etiological factor for such a symptom complex may, among other things, be interstitial keratitis due to hereditary syphilis.

A glaucomatous eye, the cornea of which was anæsthetic and opaque at the time of enucleation was placed by MAGITOT (86, **The possibility of preserving the human cornea for a long time in a living condition**) in a hæmolytic serum of another person. After a few hours the cornea cleared up and a week later it was taken from the serum and used for transplantation to a third person. It healed in place smoothly and remained transparent during seven months of observation.

METAFUNE (87, **Epithelial inclusions in the cornea**) examined the epithelium of normal and diseased corneæ for the



presence of the Halberstaedt-Prowazek inclusions, but could find them in none of the 28 cases, including three of trachoma.

CAUSÉ.

The cornea in REBER'S (88, **Hyaline degeneration of the cornea**) case although superficially smooth showed an irregular oval patch, 5mm by 7mm, which was of the color of old ivory and apparently just underneath the epithelium. There was a history of having had something in the eye followed by an opacity, which had gradually increased to its present size during the past four years. He is inclined to think the condition a hyaline degeneration which is not uncommon as a secondary phenomenon, but must be rare if primary.

ALLING.

It was observed that the eye treated by CHARLES (89, **Serpiginous ulcer treated by vaccine and urotropin**) became worse when the urotropin was stopped, the cornea turning yellow and the anterior chamber refilling with pus. The recovery is attributed to the medication and to the increased resistance induced by the vaccine, although when last seen the patient had only light perception.

ALLING.

#### XV.—IRIS AND PUPILS. Reviewed by NICOLAI.

90. HESSE. Contribution to the mechanics of the movements of the iris, together with remarks concerning the innervation of the muscles of the iris. *Klin. Monatsbl. f. Augenheilkunde*, Feb., 1912.

91. ERLNMEYER, A. Periodic onset of a changing pupil. *Berl. klin. Wochenschrift*, 1912, p. 539.

92. JARNATOWSKI. A case of hippus iridis and mydriasis of the left eye. *Zentralbl. f. prakt. Augenheilkunde*, Feb., 1912.

93. HIRSCHBERG, J. Vermiform contractions of the sphincter pupillæ. *Zentralbl. f. prakt. Augenheilkunde*, Jan., 1912.

94. SICARD and GALEZOWSKI. Horner's syndrome following injections into the ganglia of the trigeminus for facial neuralgia. *Recueil d'ophtalmologie*, p. 225.

HESSE (90, **Movements of the iris**) studied the behavior of the pupil in a patient 16 years old from whom he removed a tumor of the orbit without being able to protect the optic nerve. He thinks that the strength of the sphincter overbalances that of the dilatator because its tonicity is the greater independently of the central organ. The static balance can

be determined only when the muscles are excluded and cannot contract. This case showed after atrophy of the muscles a dilatation of the pupil. It is also remarkable that the muscles functionated four years after the operation, and then atrophied. Hence it is to be supposed that the trophic unity was preserved unharmed, that the peripheral neuron was not affected by the section. This continuing contractility of the sphincter may be explained with the aid of the ciliary ganglion, but not that of the dilatator, for the long ciliary nerves were divided. Hesse thinks there must be an intraocular center for these muscles.

ERLENMEYER (91, **Changing pupil**) saw movements of the pupil that have not been hitherto described in a woman 48 years old. The pupils continually changed their forms, were sometimes round, sometimes oval, sometimes dumb-bell-shaped, with intermediate forms. The movements of the pupil resembled those of the amoeba. Warning was given of the approach of these attacks, which lasted about half a minute. They usually appeared on only one side. Hysteria was proven by the increased reflexes, the contraction of the field of vision, the absence of the corneal reflex, the hypæsthesia and hypalgæsia of the cornea. The writer does not think this a form of hippus, but that it is a phenomenon of hysteria.

According to the definition of Gaupp, hippus iridis is a phenomenon in which the pupil rhythmically becomes larger and smaller independently of any sensory, psychic, or other form of stimulation. JARNATOWSKI (92, **Hippus iridis**) saw this picture in a woman 26 years old suffering from neurasthenia, who had mydriasis at the same time. The right pupil was 3mm, the left 7mm in diameter, and the left remained somewhat the larger when the pupils were contracted. Eserine and pilocarpine caused the mydriasis to disappear. The condition lasted 1½ years. No cause for the behavior of the pupils could be determined. There was no disease of the central nervous system and the neurasthenia alone could not explain the phenomenon.

HIRSCHBERG (93, **Vermiform contractions of the sphincter pupillæ**) reports a case of circumscribed hyperplasia of the sphincter which excited vermiform contractions. The patient was 73 years old, near-sighted, and the condition was acciden-

tally discovered on examination of an inflamed eye with Hartnack's loupe. The thickening was below, at the margin of the pupil; the contractions took place in the long axis. The thickening remained after the pupil was dilated. The phenomenon remained unchanged during 15 months of observation. A similar case has been described by Sattler, Jr.

SICARD and GALEZOWSKI (94, **Horner's syndrome following injections into the ganglia of the trigeminus**) observed paresis of the sympathetic, manifested through Horner's triad, in three cases which had been treated for trigeminal neuralgia by injections of alcohol into Meckel's and Arnold's ganglia. This paresis appeared only when the injection was made into both ganglia simultaneously through the foramen rotundum and ovale. Meckel's ganglion receives its fibres from the sympathetic plexus of the carotid, Arnold's from that of the middle meningeal artery. The paresis was observed for 6 months in one case, for a year in another, and for 18 months in the third. Horner's syndrome was alone, without vasomotor and excretory anomalies.

CAUSÉ.

#### XVI.—LENS. Reviewed by NICOLAI.

95. REIS, W. **Cystein reaction of normal and pathologically changed lenses.** *Arch. f. Ophthalm.*, lxxx., 3, p. 588.

96. COATS. **Crystal-like bodies in the lens.** *Ophthalm. Soc. of the United Kingdom*, Jan. 25, 1912.

97. GOURFEIN-WELT. **Lenticonus posterior in man.** *Arch. d'ophthalm.*, xxxi., p. 625.

98. LAZAREFF. **Experimental criticism of the autocytotoxic theory of senile cataract.** *Annal. d'oculistique*, cxlvi., p. 331.

99. TERSON. **The procedure of choice in the extraction of floating lens nuclei.** *Arch. d'ophthalmol.*, xxxi., p. 705.

REIS (95, **Cystein reaction of lenses**) gives the following results: Normal lenses give a strong cystein reaction, in which the peripheral and central layers cannot be distinguished. Cataractous lenses that are ripe give no cystein reaction, those that are immature give a weak reaction. Traumatic cataracts react positively. From these results interesting conclusions as to the biochemistry of normal and pathological lenses can be drawn; to mention one, the negative reaction depends upon

the absence of the cystein group in senile cataract, probably because of fatty degeneration of the lens fibres, as fat is negative to the cystein reaction.

COATS (96, **Crystal-like bodies in the lens**) found crystal-like bodies in the lens of a woman 69 years old, although they had not been seen clinically. They were round or oval, with fine converging lines by which the body was split up into a number of radially disposed sectors. The lens fibres formed a sort of capsule about the bodies. The patient had an over-ripe cataract.

The eye of GOURFEIN-WELT'S (97, **Lenticonus posterior**) 52-years-old patient was buphthalmic, with keratoglobus, and was enucleated on account of increased tension. A functional and ophthalmoscopic examination was impossible. On section the lens was found to have almost the form of a mushroom, the anterior surface of the lens forming the head, the posterior portion the pedicle. Microscopically the nucleus of the lens was found in its proper place, the cortex showed cataractous changes, and scattered throughout the lens substance were little black bodies which contained lime. Degenerative changes were present everywhere throughout all the membranes. Gourfein-Welt considers the diagnosis of lenticonus posterior to be difficult and believes that of the published cases he can exclude four as not of true, but of false lenticonus. The latter shows a marked difference in the refraction of the center and periphery of the lens and the most important differential sign of true lenticonus is wanting: the irregularity of the posterior lenticular image. This is because the lens retains its normal form in false lenticonus, and the difference in refraction is probably caused by histologic or histochemical changes in the nucleus. In doubtful cases a true lenticonus is favored by congenitality of the affection and the simultaneous presence of a posterior polar cataract. Hess's theory of the pathogenesis is the least objectionable. This is that the hyaloid artery in its involution exerts a tension upon the posterior capsule of the lens, which tears at its weakest place. The absence of the hyaloid artery on the ophthalmological examination is no proof that it may not have been the cause of the anomaly. The writer found in his case fibrous cords which originated from the retina were probably the result of an intrauterine



inflammation and perhaps played the part of the hyaloid artery in the production of the lenticonus.

CAUSÉ.

LAZAREFF (98, **Autocytotoxic theory of senile cataract**) concludes from his experiments that amboceptors specific for the lens exist neither in the serum of immunized rabbits, nor in that of normal or cataractous men. He believes that the explanation of the origin of senile cataract is to be found in the senile loss of soluble albumins from the lens, while the lens capsule, changed chemically and structurally by age, is permeable for substances which it normally turns aside.

CAUSÉ.

For the extraction of small floating lens nuclei, which very easily change their positions either in front of or behind the pupil, TERSON (99, **Extraction of floating lens nuclei**) recommends to contract the pupil as much as possible with eserine before anæsthetization, then to transfix the nucleus with a long, very fine, sharp discission needle and have it held upward and inward by an assistant. A linear section is then made outward and below from the temporal end of the horizontal diameter of the cornea to the lower end of its vertical meridian. The nucleus can then be removed with a spoon or loop, usually without difficulty.

CAUSÉ.

#### XVII.—VITREOUS. Reviewed by KÜMMELL.

100. LOEWENSTEIN and SAMUELS. **Replacement of the vitreous.** *Arch. f. Ophthalmologie*, lxxx., 3, p. 500.

101. ELSCHNIG. **Replacement of the vitreous.** *Ibid.*, p. 514.

LOEWENSTEIN and SAMUELS (100, **Replacement of the vitreous**) find from their experiments on rabbits that small quantities of vitreous, 0.3 *ccm*, can be removed without harm, but a transparent medium is never restored if the loss exceeds 0.5 *ccm*. Replacement of the vitreous by a 0.85% solution of salt is borne without reaction, and the vitreous almost always remains clear, except for glittering flecks, which resemble the picture of synchysis scintillans and correspond to the destroyed vitreous tissue. Vitreous opacities are caused by hyper- and hypo-tonic solutions. Ringer-Locke's solution gave better

results as regards transparency of the vitreous than anisotonic solutions of salt, but worse than isotonic.

ELSCHNIG (101, **Replacement of the vitreous**) reports the results of a number of cases in which he withdrew diseased vitreous and replaced it with an 0.85% solution of salt. In four with hemorrhage into the vitreous the result was very good, so that he recommends this procedure as the best in such cases. A good result was obtained in two out of six cases of iridocyclitic opacities. In two cases of purulent infiltration the results were temporarily good. He likewise recommends the filling of the vitreous cavity with this fluid after injuries, when the wound can be closed by sutures. More than 0.5 or 0.6ccm of the vitreous should never be removed and replaced; he has never seen harm result within these limits. The operation can be repeated several times.

#### XVIII. CHORIOID. Reviewed by KÜMMELL.

102. BACH. **Etiology and course of diseases of the uveal tract.** *Zeitschrift f. Augenheilkunde*, Jan., 1912, p. 8.

103. COATS. **Tubercle of the chorioid in cats.** *Ophthalm. Soc. of the United Kingdom*, Jan. 25, 1912.

104. TODD, F. C. **Single rupture of the chorioid involving half the circumference of the eyeball.** *Ophthalmic Record*, May, 1912.

105. SHOEMAKER, W. A. **Central guttate chorioiditis.** *Amer. Jour. of Ophthalmology*, March, 1912.

106. STIRLING. **A form of family chorioiditis.** *Ophthalmoscope*, 1912.

BACH (102, **Etiology and course of diseases of the uveal tract**) has collated 400 cases of diseases of the uveal tract and comes to the following conclusions: Iritis and cyclitis are bilateral in only 15 to 21%, while iridocyclitis and chorioiditis are bilateral in from 52 to 61% of the cases. Tuberculosis is the cause in 15% of the cases of iritis and cyclitis, in 18% of those of chorioiditis, and in 20% of those of iridocyclitis. Rheumatism is a rarer cause in chorioiditis than in iritis, from 7 to 18%. Very frequently the history and general examination furnish no guide to the etiology. The prognosis is most favorable in iritis, most unfavorable in chorioiditis, in the ratio of 70 to 40% of recoveries. Tuberculin was used in 21 cases; the result was good in some, in others it had no effect, or was of only transient benefit.

COATS (103, **Tubercle of the chorioid in cats**) reports six

cases, five of which were bilateral. The tapetum of the chorioid resists rupture; at the places where it was absent, yellowish exudations were visible beneath the vessels. Detachment of the retina took place regularly and early. The vitreous contained bands, and later iritis set in without nodules with a vascularized exudate in the pupil. Usually the other organs were also tuberculous.

TODD (104, **Single rupture of the chorioid involving half the circumference of the eyeball**) describes a rupture which began at the middle of the nasal margin of the disk and extended in a horizontal line to the periphery of the fundus, at least as far as it could be followed. It was a little wider than a large vein. It was produced by a contusion received eight years before the examination.

ALLING.

SHOEMAKER (105, **Central guttate chorioiditis**) reports three cases of central chorioiditis which were probably of inflammatory origin and caused by arteriosclerosis.

GILBERT.

STIRLING (106, **A form of family chorioiditis**) describes a family of six brothers and sisters, of whom one sister and two brothers were attacked when 8 years old with central chorioiditis which led to a high degree of amblyopia. There was no consanguinity and no manifest signs of syphilis.

GILBERT.

#### XIX.—SYMPATHETIC OPHTHALMIA. Reviewed by KÜMMELL.

107. DEUTSCHMANN, F. **Pathogenesis of sympathetic ophthalmia.** *Arch. f. Ophthalmologie*, lxxxi., 1, p. 36.

108. ELSCHNIG. **Papilloretinitis, neuritis retrobulbaris, and amblyopia sympathica.** *Ibid.*, lxxxi., 2, p. 356.

109. POELLLOT. **A case of sympathetic ophthalmia with the condition of both eyes.** *Ibid.*, lxxxix., 2, p. 264.

DEUTSCHMANN (107, **Pathogenesis of sympathetic ophthalmia**) found microscopically a few Gram-positive diplococci in the chorioid and optic-nerve sheath in another case of sympathetic ophthalmia. Some of the cultures remained sterile, in others Gram-positive cocci were cultivated. He claims that the agent of sympathetic ophthalmia is a Gram-positive diplococcus, and adduces in evidence a former case of R. Deutschmann's and one of Grunert's. (In the latter, neither

Grunert, nor Schleich, nor Baumgarten and Henke could find micro-organisms, while in Deutschmann's it was possible to find diplococci.) He was able to cultivate sarcinæ several times from eyes with microscopically demonstrable diplococci, and tries to prove from literature and his own experiments that yellow sarcinæ change into white diplococci, which might be taken for avirulent white staphylococci if one was ignorant of their origin, so as to explain the apparent contradiction between the microscopic and cultural findings. After an analysis of the more recent hypotheses of the abacterial genesis of sympathetic ophthalmia, he summarizes his results as follows: (1) True sympathetic ophthalmia has been produced in monkeys and rabbits by the inoculation of pieces of the chorioid of human eyes that excite the disease. (2) A Gram-positive diplococcus is the agent of sympathetic ophthalmia. Perhaps we have to see in it only a modified sarcina. (3) The disease attacks the second eye when the bacteria are able to travel along the lymph sheaths of the first optic nerve to the chiasm and from there in the lymph sheaths of the second optic nerve back to the orbit. (4) The path followed by the bacteria from the eye to the optic-nerve sheaths and the reverse, may be either direct from the chorioid into the inter-vaginal space, or with the anterior ciliary vessels in order to pass within the muscles of the orbit around and behind the eye to the central vessels, into the sheaths of the optic nerve, and *vice versa*. The chronic inflammatory changes in the meninges are circumscribed and cause no general symptoms.

ELSCHNIG (108, **Papilloretinitis, neuritis retrobulbaris, and amblyopia sympathica**) reports a case in which inflammation followed a cataract extraction. Some months later the other eye began to suffer from neuroretinitis, which was thought at first to be sympathetic. The apparently exciting eye was enucleated without influencing the course of the disease in the other. Microscopically it showed no trace of the form of inflammation known to excite sympathetic trouble. The patient had at the same time an empyema of the accessory sinuses, to which the neuroretinitis was finally ascribed. From a compilation of the cases reported of sympathetic papilloretinitis Elschnig concludes that in no case of this disease has the sympathetic nature been perfectly proved. If it exists



at all, he agrees with Schirmer that under certain circumstances the toxins of the bacteria, especially the products of the breaking down of albumin, may pass to the other nerve by way of the chiasm, but no proof of this has been adduced, and the favorable effect of enucleation of the first eye speaks against this etiology. He is also sceptical concerning sympathetic simple atrophy of the optic nerve, as well as sympathetic amblyopia.

POELLOT (109, **A case of sympathetic ophthalmia**) gives the clinical history of a patient in whom an increase of tension developed after a certainly not perforating injury of the eyeball. Thirteen days later iridectomy was performed with transient benefit. The wound healed well without infection. Eight weeks after the injury the eye was enucleated and soon after that sympathetic inflammation appeared in the other eye. The microscopic examination of the first eye revealed an injury nowhere. The iridectomy wound was healed externally, but gaped a little internally and held an incarceration of the iris. The characteristic condition described by Fuchs was present in the chorioid, mostly lymphocytes, fewer epithelioid cells, rarely giant cells. The entire uvea showed the well-known changes of sympathetic ophthalmia. The papilla was oedematous. Micro-organisms were not found. Although the injured eye was not perforated and the iridectomy was without infection, Poellot believes an ectogenous infection took place through the cicatrix, which was perhaps held open for some time by the incarcerated iris. This agent must have remained latent for four weeks and then suddenly have become active.

#### XX.—GLAUCOMA. Reviewed by KÜMMELL.

110. BJERRUM. Pathogenesis of glaucoma. *Klin. Monatsbl. f. Augenheilkunde*, Jan., 1912, p. 42.

111. PRIESTLEY-SMITH. Glaucoma problems. *Ophthalm. Review*, Jan.-March.

112. HUSSELS. A contribution to the pathology of glaucoma. *Zeitsch. f. Augenheilkunde*, xxvii., 3, p. 213.

113. WEITBRECHT. Anatomical studies of 12 cases of secondary glaucoma. *Inaugural Dissertation*, Tuebingen, 1912.

114. DUBOIS. A case of herpes zoster ophthalmicus and acute glaucoma. *Tijdschr. v. Geneesk.*, 1912, No. 5.

BJERRUM (110, **Pathogenesis of glaucoma**) thinks that the fundamental cause of the syndrome of inflammatory glaucoma

is an inflammation and not an engorgement. Edema of the lids and conjunctiva cannot be ascribed to engorgement in the uveal tract, neither can fresh posterior synechiæ, or deposits on Descemet's membrane. He thinks the inflammation is of a peculiar nature, is situated in the ciliary body, is associated with hypersecretion, and is perhaps caused by special toxins. He regards prodromata as slight inflammations that quickly pass off. His explanation of glaucoma simplex is that the pathogenic agent which causes in some cases increase of secretion and irritative inflammatory phenomena, produces in others, when less virulent, simply an increase of secretion. Secondary glaucoma, on the contrary, when due to circular posterior or anterior synechiæ, may very well be ascribed to obstruction to the outflow in the sinus of the anterior chamber, yet if toxins should appear in such an eye they might produce an irritative condition. Increase of tension after luxations of the lens he ascribes less to an increased quantity of albumin in the aqueous than to irritation of the iris and of the ciliary body, which causes a hypersecretion. Attacks of increased tension after the use of mydriatics, which have often been thought to be due to occlusion of the sinus of the anterior chamber by the contracted iris, may perhaps be caused by action of the drug to increase the secretion. The effect of meiotics is explained in a similar way.

PRIESTLEY-SMITH (111, **Glaucoma problems**) says that glaucoma simplex can be present without increase of tension when the lamina is deficient in resisting power, but ordinarily increased tension can be detected by repeated tests. Its frequent occurrence in advanced life he explains through increased blood pressure, as through increased exudation in consequence of degenerative changes in the ciliary body. A change of the perceptible fluid therefore does not probably come into account in the pathogenesis of glaucoma.

GILBERT.

HUSSELS (112, **Pathology of glaucoma**) describes clinically and pathologically a case of acute inflammatory glaucoma in which the eye was enucleated 14 days after the onset of the inflammatory symptoms. There had previously existed excavation without inflammatory changes. He lays special weight on the examination of the blood-vessels. The vortex

veins were without any considerable changes. Schlemm's canal was open and filled with blood. In its wall were pigment and round cells which particularly infiltrated the trabeculæ about it. The veins of the iris were hyperæmic, the arteries were normal; in places there was hyaline degeneration; in the ciliary body and chorioid also there was an extreme fullness of the veins with approximately normal arteries. The anterior ciliary arteries were contracted by arteritic processes, while the posterior were dilated a short distance from their passage through the sclera, although they had been contracted by sclerosis. The posterior long ciliary arteries exhibited circumscribed endarteritic proliferation. The retinal arteries were very sclerotic; in places there were hemorrhages. The central artery was endarteritic. The central vein was occluded by newly formed tissue at the lamina cribrosa. The papilla was excavated; the lamina cribrosa was not pressed back, and had cavities in front of it in the tissue.

WEITBRECHT (113, **Secondary glaucoma**) examined 12 cases of secondary glaucoma produced by a variety of causes, and found in 11 the cavities described by Schnabel. When there was neither excavation nor bending backward of the lamina cribrosa the formation of cavities was only slight; it was greatest when the lamina was bulged outward without excavation, while when the nerve was cupped the lacunæ again decreased in extent.

Following an attack of herpes zoster of the first branch of the trigeminus, which had lasted some weeks without demonstrable disease of the cornea, came an attack of acute glaucoma. DUBOIS (114, **Herpes zoster ophthalmicus and acute glaucoma**) thinks that the irritation of the sympathetic fibres in the trigeminus was the cause. B. P. VISSER.

#### XXI.—RETINA. Reviewed by MEYER.

115. ROURE. Sudden, transient amblyopia in high hypermetropia (autotoxic amblyopia). *Annal. d'oculistique*, cxlvi., p. 348.

116. KOMOTO. A contribution to the pathology of the so-called pre-retinal hemorrhage. *Klin. Monatsbl. f. Augenheilkunde*, p. 309.

117. INOUE. Formation of retinal cysts and papillitis after inflammations of the anterior segment of the globe. *Arch. f. Ophth.*, p. 118.

118. NAKAIZUMI. A contribution to the pathology of retinitis cachecticorum ex carcinoma ventriculi. *Klin. Monatsbl. f. Augenh.*, p. 290.

119. TEULIERES. A case of retinitis proliferans. *Archives d'ophtalm.*, xxxi., p. 723.
120. SUGANUMA. A contribution to the pathology of pigment degeneration of the retina. *Klin. Monatsbl. f. Augenheilk.*, xiii., p. 175.
121. IGRSHEIMER. Retinal disease in tuberculosis. *Erzteverein Halle*, Feb. 7, 1912.
122. SCHIECK, F. Perithelioma of the central retinal vessels, a long unknown clinical picture. *Arch. f. Ophthalm.*, lxxxi., p. 320.
123. DEUTSCHMANN. An atypical glioma of the retina. *Zeitschrift f. Augenheilkunde*, xxvii., p. 225.

ROURE (115, Sudden, transient amblyopia in high hypermetropia) observed in three persons between 6 and 20 years of age a reduction of the vision to counting fingers at a short distance. Aside from this amblyopia the eyes presented no morbid signs; the hypermetropia of each was between 8 and 12 D. The vision returned to normal, without special treatment, within 14 days. Roure believes that this amblyopia is caused by chemical products in the retina, which can accumulate there in high hypermetropia in consequence of the increased claims of the accommodation. He calls the phenomenon autotoxic amblyopia. CAUSÉ.

KOMOTO (116, Pathology of preretinal hemorrhage) describes a case of extensive hemorrhage in the region of the macula in a patient with the hemorrhagic diathesis. He thinks that in most of these cases the extravasation is intraretinal rather than preretinal, and that true preretinal hemorrhages are met with only in the rare cases in which the papilla is involved in the hemorrhage. The fluidity of the extravasation in many cases he explains as due to a defibrinization produced by the passage of the blood through the layer of nerve fibres, in which the fibrin is deposited.

INOUE (117, Retinal cysts and papillitis after inflammations of the anterior segment of the globe) reports four cases which show in common an inflammation of the anterior segment of the eyeball and cystic degeneration of the macula. He does not agree with Fuchs that the vulnerability of the macula to toxins is the reason why this place in particular is affected, but ascribes it to the similarity, *i.e.*, the poverty of the vascular supply of the ora serrata and macula. In his opinion the oedema of the retina is primary, and then comes the degeneration of the elements of the retina. A close genetic connection



exists, he thinks, between papillitis and the formation of cysts through the changed conditions of diffusion in the vitreous, which in some cases was completely fluid. Diseases of the blood or of the vessels may be the cause of the hemorrhages. The vascular changes may, on the other hand, be secondary to the action of the toxins.

NAKAIZUMI (118, **Pathology of retinitis cachecticorum ex carcinoma ventriculi**) studied a case of carcinoma ventriculi in which hemorrhages and white spots were observed in the retina. The former were in the layer of nerve fibres. The white spots were due to varicose hypertrophy of the non-medullated nerve fibres and the presence of fatty substances. Forms resembling nuclei in the varicose fibres corresponded to swollen axis-cylinders. The fatty substances were cholesterin ether and phosphates, which appear in the white spots through exogenous formation of fat, perhaps lipæmia.

TEULIERES (119, **Retinitis proliferans**) observed in a young woman 21 years old a retinitis proliferans which had developed from recurrent hemorrhages into the vitreous in dysmennorrhœa. There was a large hemorrhage into the vitreous which became absorbed and organized fairly quickly; at the same time an inflammatory reaction of the retina and chorioid was excited by contact with the masses of blood, which resulted in a proliferation of Mueller's fibres. CAUSÉ.

SUGANUMA (120, **Pathology of pigment degeneration of the retina**) found in an eye with retinitis pigmentosa, which had been enucleated because of injury from a patient 67 years old, that the pigment degeneration of the retina is not a disease caused by disturbance of the circulation in the choriocapillaris, but is an independent disease of the retina. The destruction of the neuro-epithelium is due to the sclerosis of the retinal vessels, or else both of these morbid symptoms are to be ascribed to a single cause as yet unknown. The pigment infiltration of the retina is a secondary phenomenon which is caused mainly by the entrance of the proliferating bands of pigment epithelium in the pathologically dilated spaces in the tissue, especially in the perivascular lymph spaces.

IGERSHEIMER'S (121, **Retinal disease in tuberculosis**) cases confirm the statement that tuberculosis is often the cause of disease of the retinal vessels and of its consequences, such as

hemorrhages into the vitreous. In the four cases reported, treatment with tuberculin gave no better result than the older methods.

SCHIECK (122, **Perithelioma of the central retinal vessels**) reports finding an extremely rare tumor of the fundus, a perithelioma of the central vessels, a form of tumor that occurs in the brain and is malignant. The case is similar to one reported by Salzmann except that in the latter the tumor lay behind the globe and penetrated into it.

DEUTSCHMANN (123, **Atypical glioma of the retina**) observed a glioma of the retina in each eye of a child. The tumor, about as large as a pea in one eye underwent almost total involution under inunctions and injections of kakodyl. The other eye was enucleated. The peculiarity of the tumor was that it started from the pigment epithelium and showed its malignant character by numerous metastases in the retina and some into the chorioid, which cannot be looked upon as scattered embryonal cells, but as pigment cells transformed into tumor cells. The only explanation, according to the author, is a sort of retrogression of the cells to conditions similar to embryonal, associated with a markedly increased tendency to subdivision.

## XXII.—OPTIC NERVE AND THE VISUAL TRACT. Reviewed by MEYER.

124. COATS. **Concretions in the papilla and corpora amylacea in the retina.** *Ophthalm. Soc. of the United Kingdom*, Jan. 25, 1912.

125. PADERSTEIN. **Colloid formations on the right optic-nerve head.** *Berl. Ophth. Ges.*, 1912.

126. KOYANAGI. **A case of primary tumor of the optic nerve.** *Klin. Monatsbl. f. Augenheilkunde*, 1912, p. 283.

127. KRAUSS. **A primary tumor of the optic papilla.** *Zeitschrift f. Augenheilkunde*, xxvii., p. 142.

128. DUBOIS. **A case of monolateral rhinogenous papillitis.** *Nederl. Tijdschr. v. Geneesk.*, 1912, vol. i., No. 5.

129. PIERRE MARIE and LERI. **Clinical and anatomical studies of cortical blindness.** *Recueil d'ophthalmologie*, p. 228.

COATS (124, **Concretions in the papilla and corpora amylacea in the retina**) found in an eye enucleated because of sarcoma of the iris mineral deposits of a wavy concentrically laminated structure on the papilla. At first they are small round bodies

and they grow by superficial accretion. They lie not encapsuled in the nerve substance. Numerous corpora amylacea show that they come from the neuroglia and not from the myelin sheaths. The concretions and the corpora amylacea occur together either accidentally, or they have a common origin, but the one is not dependent on the other.

PADERSTEIN (125, **Colloid formations on the right optic-nerve head**) reports a case of colloid formations on the papilla which simulated perfectly the appearance of atrophic discoloration. Vision and visual field, even for colors, were normal, so it could not be mistaken for a case of atrophy with secondary colloid deposits.

KOYANAGI'S (126, **Primary tumor of the optic nerve**) case of primary tumor of the optic nerve presented the two following characteristics microscopically: (1) Development of the tumor in the interseptal spaces without marked involvement of the septa; (2) the presence mainly of spindle cells, and finally the appearance of homogeneous gelatinous masses in the tumor tissue as intercellular basal substance.

KRAUSS (127, **Primary tumor of the optic papilla**) observed a tumor of the papilla in a patient 26 years old. Tuberculosis and syphilis were excluded. Inunctions were of no benefit. The eye was then enucleated and the tumor was found to be an angiosarcoma or perithelioma of the walls of the central vessels.

In the case reported by DUBOIS (128, **Monolateral rhinogenous papillitis**) the vision began to fail after the evacuation of the empyema in the posterior ethmoidal cells, and he was able to observe the development of the papillitis from the beginning. Both the papillitis and the vision improved after some weeks. Pressure can therefore be excluded as the cause of the papillitis in this case.

B. P. VISSER.

PIERRE MARIE and LERI (129, **Clinical and anatomical studies of cortical blindness**) had the opportunity to examine the brains of three persons who had suffered from cortical blindness during life. In all three there was a bilateral focus of softening in the visual center, although the foci exhibited great differences as regards their extent both in surface and depth. In two cases the touching of the lower convolution of the calcarine fissure by the focus of softening on the left side

sufficed to cause hemianopsia on the opposite side. The extent of the focus of softening in cases 2 and 3 directly favored the theory that the cuneus is a part of the visual center, although they do not prove it to be such. At all events it is shown that the hemianopsia is the more extensive and the more marked the nearer the lesion is situated to the convolutions of the calcarine fissure. The continuance of the central vision, when this can be detected, and the different degrees to which the right and left sides of the field are blinded, serve as a basis for the clinical diagnosis, but the former is usually not to be detected because of the peculiar mental and psychical conditions of the patients. The condition of the vision often seems to be paradoxical; there is a distinct tactile and visual agnosia. In the same way the power of recollection of objects and the power of orientation in regard to space and time are destroyed. Occasionally, on the other hand, the very good mental conditions of these patients are surprising. The persistence of the pupillary reaction has been held to indicate that the focus of disease lay behind the *corpus geniculatum externum*, where the pupillary fibres leave the visual tract to go to the center of the *oculomotorius*, but these authors think that perhaps the explanation of the preservation of the pupillary reaction is that the impression to light is preserved and that only its interpretation is destroyed. A later work is to deal more in detail with the microscopic condition. CAUSÉ.

XXIII.—DISEASES CAUSED BY ACCIDENTS, INJURIES, FOREIGN BODIES, AND PARASITES. Reviewed by MEYER.

130. ROCHE. Tar thrown violently into the eyes. *Annales d'oculist.*, cxlvi., p. 345.

131. POSEY, W. C. Shrunken globe enveloping an unusually large fragment of steel. *Annals of ophthalmology*, April, 1912.

132. HENDERSON, F. L. A case which demonstrates the hardihood of the human eye. *Amer. Jour. of Ophthalmology*, March, 1912.

133. BEHR, C. Choked disk following perforating injuries of the globe. *Klin. Monatsbl. f. Augenheilkunde*, Jan., 1912, p. 56.

134. V. HIPPEL. Extractions of non-magnetic foreign bodies. *Muench. med. Wochenschrift*, 1912, p. 728.

135. MCCOOL, J. L. Rupture of Descemet's membrane due to a blow from a blunt object. *Ophthalmology*, April, 1912.



A cask of Norwegian tar, which had stood all day in the sun, exploded and some of its contents were driven into the eyes of a workman so that he could no longer see. On examination ROCHE (130, **Tar thrown violently into the eyes**) found both corneæ covered with a black layer of tar and the eyes much irritated. After the eyes had been cocainized the shell of tar was carefully removed from the subjacent clear cornea. Recovery took place in a few days leaving no traces.

CAUSÉ.

A piece of steel measuring 28mm by 16mm enveloped in a shrunk eyeball was removed by POSEY (131, **Shrunk globe enveloping an unusually large fragment of steel**). The injury occurred five years before and did not occasion sympathetic ophthalmia.

ALLING.

In HENDERSON'S (132, **Case which demonstrates the hardness of the human eye**) case a piece of glass 12mm long, 5½ mm broad, and 1mm thick entered the eye 5mm from the temporal margin of the cornea and caused no inflammation until its removal 40 days later.

GILBERT.

BEHR (133, **Choked disk following perforating injuries of the globe**) had the opportunity to see the development of typical choked disk, both ophthalmoscopically and microscopically in six cases of perforating wounds and diseases of the anterior segment of the globe which were associated with great hypotony. A considerable prominence of the papilla was produced by a great oedema in which there were little or no signs of inflammation. The oedema was confined to the intraocular part of the optic nerve and stopped at the lamina cribrosa. Toxic and inflammatory causes were excluded. According to Behr an accumulation of fluid is caused to take place in the head of the optic nerve by the hypotony existing in the above-mentioned diseases.

V. HIPPEL (134, **Extractions of non-magnetic foreign bodies**) reports the extraction of 12 non-magnetic foreign bodies from the vitreous. In five enucleation had to be performed at once. Of five eyes that were operated on successfully one had to be enucleated later. Useful vision was saved in three, detachment of the retina took place in one. A meridional section was made in all and the foreign body was removed with forceps under a strong electric light.

McCOOL (135, **Rupture of Descemet's membrane due to a blow from a blunt object**) saw an eye which had received a severe contusion from a piece of metal and observed a Y-shaped figure in the deeper parts of the cornea with other smaller lines about it, denoting a rupture of Descemet's membrane. The anterior chamber was partly filled with blood and there was also some oedema of the cornea. The eye recovered with practically normal vision.

ALLING.

## BOOK REVIEWS.

**I.—Ophthalmoskopische Diagnostik** (Ophthalmoscopic Diagnosis), based on typical pictures of the fundus oculi with reference to cases of importance for general medicine, for physicians and students. By Dr. C. ADAM, Assistant at the Royal University Eye Clinic, Berlin. 86 colored drawings. Urban and Schwarzenberg, Berlin and Vienna, 1912. Price, 21 Marks.

This book differs from most text-books on ophthalmoscopy because the making of a diagnosis from the ophthalmoscopic lesion is the all-important aim rather than merely a pictorial representation of the fundus condition. The author as a pupil of the late v. Michel has been thoroughly impressed with the important relation between the eye and general diseases. The book serves therefore as a text-book with the broadest foundations, whose careful study must be of the greatest benefit. The author deserves great credit for again pointing out in a masterly way the importance of a general medical knowledge in the correct interpretation of a fundus change, for, with very few exceptions, do not all ophthalmoscopic lesions represent a disturbance of the general health? After a brief description of ophthalmoscopic technic and of the normal fundus, the optic nerve, the retina, and the choroid are taken up in turn, describing the anatomy, the general and special diagnosis of the pathologic variations. The text is clearly written, and instructive. The illustrations are excellent; the one of a beginning glioma retinae is particularly remarkable. The book-making is fully up to the standard, and the price very low.

A. K.

**II.—Ophthalmic Surgery.** By Dr. JOSEF MELLER, First Assistant at the Clinic of Professor Fuchs, Vienna. Edited by

Dr. W. M. SWEET, Philadelphia. With 173 illustrations. Second Edition. Philadelphia, P. Blakiston's Son & Co., 1912. Price, \$3.50 net.

Meller's excellent book on eye operations, as practiced in the Fuchs clinic, has in this new edition been thoroughly revised with the aid of the editor, Dr. Sweet. The subject-matter has been rearranged, a description of new operations added, and the list of illustrations has been increased. The book, in its new form, will be a great assistance to those desirous of profiting by the experience of the large operative material which the Fuchs clinic commands, not to mention those from all over the world who begin their training in eye operations at that clinic. The methods of operations, and the indications, are those which have stood the test of time; there can be no better recommendation. A. K.

**III.—Das Trachom nach dem gegenwärtigen Stande der Forschung** (The Present State of our Knowledge of Trachoma). By Prof. Dr. G. STANCULEANU and Dr. D. MICHAIL (Bucharest). J. Safar, Wien-Leipzig, 1912.

The authors cover in a lucid and practical manner the subject of trachoma in a monograph of 73 pages. Special chapters take up the definition and history, the etiology, pathologic anatomy, evolution and complications, the differential diagnosis and treatment of trachoma. Two maps showing the geographical distribution of this disease and the chapter dealing with the subject of prevention deserve special attention of the reader. The authors regard the so-called "trachoma bodies" as products of degeneration of the protoplasm and nuclei of the epithelial cells of the conjunctiva, and they give illustrations of such cells, containing the "trachoma bodies" found even in chalazions. The monograph contains numerous personal researches and valuable clinical observations based upon zealous laboratory work and upon observations of a very large number of patients with trachoma who flock from all over Roumania to the eye clinic of "Spitalul Colzea" of Bucharest. It is interesting to note the attempt of the authors to work out a complement fixation test for the serum of patients with trachoma.

In the chapter describing the various types of trachoma we



read about a form—not described in text-books—which involves especially the bulbar conjunctiva, giving earlier and more frequent complications on the cornea than any other type of trachoma. The authors recommend and describe in detail the use of the tooth-brush after the method ("grattage") of late Prof. Manolescu. This method has been almost exclusively used by Roumanian ophthalmologists for the past twenty-five years among a population very rich in trachoma, and the writer of these lines, who has seen Prof. Manolescu's work, entirely agrees with Stanculeanu and Michail, who praise the "grattage" as the shortest and most successful method of treating trachoma.

M. J. SCHOENBERG.

**IV.—Anatomy and Histology of the Human Eyeball in the Normal State, its Development and Senescence.** By Professor M. SALZMANN, Graz. Translated by Dr. E. V. L. BROWN, Chicago. With 5 text figures and 9 plates. The Chicago Medical Book Co., Chicago, 1912. Price, \$5.00.

Salzmann's *Anatomy of the Eye* was reviewed when it first appeared in German, in these ARCHIVES, p. 203, vol. xli., 1912. It now appears in an English translation by Dr. E. V. L. Brown, together with the original plates. The many excellent features of Salzmann's *Anatomy* are now available to a wide circle of readers through the enterprise of Dr. Brown; for it is not always easy to obtain a publisher for a translation of a purely scientific book. The work of the translator deserves favorable comment; the German text, which is excellent, has not suffered in its translation. It should be stated that this book is not solely an anatomic treatise, but it has frequent references to ophthalmoscopy and to pathologic processes.

A. K.

**V.—The Ocular Muscles.** By H. F. HANSELL and W. REBER of Philadelphia. With 3 plates and 82 other illustrations; pp. 223. Second edition. Philadelphia: P. Blakiston's Son & Co., 1912. Price, \$2.50 net.

Hansell and Reber's little book on the muscular anomalies of the eye now appears in a new, rewritten, and enlarged edition. It is a practical and conservative guide to the study of this important subject.

A. K.

**VI.—Practical Exercises in Physiological Optics.** By GEORGE J. BURCH. Crown 8vo, pp. 164. Oxford: At the Clarendon Press, 1912. Price, \$1.35.

This is a laboratory manual of experiments in physiological optics. It is divided as follows: Section I.—Methods for Determining the Constants of a Lens. Section II.—Dioptrics of the Eye. Section III.—Judgments. Section IV.—Sensations of the Eye. Section V.—Color Blindness. Section VI.—Phenomena of Flashing Light.

The descriptions are clear and do not demand too deep a knowledge of mathematics, so that it is to be hoped that this book will stimulate the study of this often neglected subject.

A. K.

**VII.—Die Störungen der Sehfunktionen** (The Disorders of the Visual Functions). By Dr. W. LOHMANN, First Assistant of the University Eye Clinic, Munich. With 39 illustrations, in part colored. Pp. vii+, 206. Published by F. C. W. Vogel, Leipzig, 1912. Price, 10 Mk.

A book planned to fill a space in our literature hitherto unoccupied deserves a careful and extended review. Prof. Lohmann's effort to describe the disorders of the visual function is admirable in many respects; it leaves something to be desired, however, in that it attempts to cover a very large field in a comparatively small compass. This entails omissions of much that might be interesting and a condensed treatment of certain subjects with the sacrifice of clearness. The text is interspersed with quotations of articles and references to sources with which the author is evidently quite familiar, but which to the unversed reader provide merely an introduction, although, it may be granted, a very stimulating one. Often the gist of long and tedious research is given in a few sentences, and in a manner easily available. In some instances, however, a clear and simple restatement is hardly to be expected, much less a condensation.

It is not so much a text-book of physiological optics as an attempt to apply to morbid phenomena the principles of Helmholtz, Hering, and many others, and to deduce from the pathological, evidence applicable to the normal.

Opinions may vary as to the success of the author in his

ambitious effort, but there can be no question regarding his fitness for the task. The book shows a very thorough training, chiefly, it would seem, in the laboratory, and a broad grasp of the subject as shown by the clear statement of difficult questions such as light sense and adaptation, theories and defects of color vision and binocular vision, as well as by brief excursions into the wide field of psychology and æsthetics. In many respects, the connecting link between theory and practice is suggested, although the author disclaims any utilitarian intent. It is possible to touch upon only a few of the salient points in detail.

Dioptrics as well as certain other important parts of ophthalmology are not treated at length, reference being made to the special work of Hess and others in Graefe-Saemisch. Gullstrand's important work on *Astigmatic Vision* might have received more than a passing allusion.

Hypermetropia is described as a condition of imperfect development, and with it are grouped congenital amblyopia, imperfect fusion power, and amblyopia from disuse—an excellent generalization, and in this connection Worth's services are recognized.

The conflicting opinions of Krusius and Straub are fairly stated. In 90 per cent. of his cases of congenital amblyopia, Heine found a central scotoma, and the author expresses the opinion that most of the cases of amblyopia from disuse belong in this class.

In the consideration of congenital amblyopia the author states that a 5mm colored object disappears in the normal eye at a distance from the center equal to  $\frac{1}{10}$  vision—that is, at about 8°, according to Dor's diagram. Granting the approximate nature of peripheral measurements, this estimate is too faulty to serve as a premise for such fine conclusions.

The clinical distinction between scotomata due to traumatism at birth and those depending on a supposed structural defect is hardly tenable or at least is not proven. An interesting application of the "Flimmer test" is attempted for the solution of the problem, and the author's results seem to show that the function of the center in the amblyopic eye, as shown by this test, is similar to the periphery. This test does not seem to be of general value.

Retrobulbar neuritis is given a brief consideration, with references to enlargement of the blind spot in disease of the sinuses, and to Fuchs's recent contribution to the symptomatology of tabes.

Peripheral defects of the field in glaucoma, atrophy, diseases of the choroid and retina, and psychic contractions are treated more fully, with numerous references.

A long chapter on Adaptation and Hemeralopia offers much of theoretical interest, but leaves one with a confused sense of the various methods of examination and the uncertain results. The occurrence of the inverted type of the color field in hemeralopia, particularly that due to icterus, suggests the need of the examination of cases of choked disk, to ascertain whether the phenomenon described by Cushing, if it should be associated with hemeralopia, may be attributed to œdema of the retina.

The theory of the functions of the rods and cones, called "*Duplizitätstheorie*," first proposed in its complete form by Parinaud and von Kries, opposed by Hess, Hering, and others, is discussed as clearly as the limited space permits and is worth a careful reading.

A discussion of color is not apt to offer much that is new, but it is a distinct merit for a review of the familiar theories to be lucid, even if it leaves the reader in his previous state of indecision. The author's statement will find ready acceptance in that there is apparent at the present time a certain fatigue with regard to the many theories and that investigators should be content with the study of phenomena, especially in the comparatively unexplored field of acquired color defects, until a new Kant appears to bridge the space between the subjective and the objective.

The description of congenital defects of the color sense, especially "*Anomale Trichromasie*" and "*Farbenschwäche*," is extremely interesting, scholarly, and lucid. The author lays stress on the importance of instruction in these little understood parts of a large and vital subject.

Short chapters on acquired defects of color perception and chromatopsia, and one on color audition (*audition colorée*), show the author's scope and add to the charm of this unusual book.

After this excursion the treatment of binocular vision is at



first somewhat involved and too condensed for perfect clearness, but the different views are stated, without attempt at conclusions, and the numerous references will lead one to consult the original articles to which the author has frequently contributed.

Much space is given to the discussion of phenomena associated with hemianopsia, and the title of the final chapter, "Gedächtnisbilder; Optische Begleit und Trugwarnehmungen," in which the speculative or psychological interest predominates, indicates the scope of the book which gives it a place apart, complementary to the text-book which deals with practical problems, a definite solution of which is of most consequence and may be reasonably expected.

The book is well printed, on glazed paper. The index is not as complete as could be desired for convenient reference. There are a few minor errors, the enumeration of which would serve no useful purpose.

C. W. CUTLER.



# ARCHIVES OF OPHTHALMOLOGY.

## CLINICAL AND EXPERIMENTAL RESEARCHES ON INTRAOCULAR DRAINAGE.<sup>1</sup>

A PRELIMINARY REPORT.

By DR. M. J. SCHOENBERG, NEW YORK.

### I.—INTRODUCTION

EXPERIMENTAL researches and clinical studies on intraocular pressure may be made from entirely new points of view in consequence of the introduction into ophthalmic practice of the Schiötz tonometer.

The advantage of the measurement of intraocular pressure by means of the Schiötz tonometer consists in its applicability to clinical work. One is thus enabled to get data more accurate and reliable than have been obtained in the laboratory, where the measurement is made on animals by connecting with a manometer a canula or hypodermic needle introduced into the anterior or posterior chamber of the eye.

The introduction of a canula into the eye means a severe trauma to this most delicate organ. Such a trauma, I believe, must disturb at least for a certain length of time, the entire mechanism of circulation of intraocular fluids. Even the mere application of the tonometer on the eye, doubtless, produces a certain amount of traumatism, but this is inconsequent compared with that due to entering the eyeball with a canula or a needle. During the past year and a half, I have utilized the tonometer of Professor Schiötz for the examination of intraocular pressure in the eyes of human subjects and of

<sup>1</sup> Read before Section on Ophthalmology, N. Y. Acad. of Med., Oct. 21, 1912.

rabbits and cats, and I am convinced that the results are more reliable and exact than would have been obtained if I had used the tonometer of Schiötz in human eyes and the canula and manometer in the eyes of animals.

Since Prof. Schiötz's second article on tonometry (*Arch. f. Augenheilk.*, vol. lxii., 1909; these ARCHIVES, vol. xl., 1911) a number of very valuable contributions discussing various questions in connection with the intraocular pressure has appeared. Some of the questions, as stated above, have been partly cleared up, but many have been left untouched. One of these is the following: **What is the normal rate of drainage of intraocular fluids in animal and human eyes, and how is this rate of drainage affected in glaucomatous eyes?**

All who have had experience with the tonometer have observed that when this instrument is continuously applied on the eye for a certain length of time, or at very short intervals, it registers a gradually decreasing o. p. (intraocular pressure)—*i. e.*, the eye becomes gradually softer. The rational explanation of this phenomenon is that the weight of the tonometer expresses a certain amount of fluid from the eye, thereby reducing its hardness. It is interesting to note that this fact has not been utilized in studying the drainage system of the normal and glaucomatous eyes. If by applying a weight on the eyeball, it is possible to express from this organ a certain amount of fluid, it is evident that there are channels in the eye through which this fluid is expressed.

It is almost universally admitted that the intraocular fluids are constantly renovated by a continuous slow flow of liquid which enters the eyeball and also by a continuous, just as slow exit of liquid. Weiss (*Zeitschr. f. Augenheilk.*, vol. xxv., 1911) stands almost alone among ophthalmologists in asserting his doubt whether normally there is a constant, continuous circulation going on in the fluid contents of the eyeball. From the time of the researches of Leber and his pupils down to the latest work on this subject by Wessely (*Zeitschr. f. Augenheilk.*, vol. xxv., 1911) it is practically admitted by all ophthalmologists that normally fluid drains from the eyeball at the same rate at which it flows into the eye, that the "intraocular pressure is obviously a function of the volume of the contents of the globe and that the variations in internal



pressure must be due to changes in the amount of fluid (blood and lymph).”—(Parsons's *The Pathology of the Eye*.)

Wessely (*loci cit.*) even figures out that the aqueous humor is drained and completely renovated every two hours. It is not within the range of this paper to describe the paths of drainage of the ocular fluids. It does not concern us, at this moment whether the draining function of the eye is taken care of by Schlemm's canal, the iris, the ciliary processes, or by the choroidal vessels, or by all together. The main question is that normally there is taking place in the eyeball a constant drainage of its fluid contents. As the intraocular pressure is maintained at a certain level by the constant volume of the contents of the globe, it is obvious that this constant intraocular pressure is possible only as long as the amount of liquid entering the eye does not exceed the amount leaving it. In eyes in which the draining function is more or less interfered with, there is a loss of balance between the two main factors (in and outflow) regulating the intraocular pressure. The ocular fluid cannot leave the eye at the same rate as it does normally and the fluid contents of the eyeball will have a tendency to increase in amount, consequently the intraocular pressure will increase also. Supposing that a weight would be constantly applied on an eye with its drainage system in good order, that weight will gradually express from that eye a certain amount of fluid in a certain number of seconds. If the same weight is applied on an eye with its draining system partially obstructed (simple glaucoma), it will take a longer time to express the same amount of fluid. Finally, if the same weight is applied on an eye with its drainage entirely obstructed (absolute glaucoma), no matter how long we wait no fluid is expressed from that eye. Imagining that instead of the weight we use the tonometer, we readily see how we can judge at the same time the amount of fluid expressed from the eye by reading off from the tonometric scale the degree of decrease of intraocular pressure when the tonometer is applied steadily for a certain time. In a normal eye the tonometer shows that the intraocular pressure is gradually decreasing at an average which we call normal; in an eye with an impaired drainage the weight of the tonometer still expresses fluid but at a much slower rate, and in an eye with absolute

glaucoma the weight of the tonometer produces no decrease of the intraocular pressure.

From the above, it is seen that the tonometer may be utilized for the accurate measurement, not only of the intraocular pressure, but also of the index of ocular drainage.

The index of ocular drainage may be defined, in general terms, as the rate or rapidity with which the ocular fluid may be expressed by the weight of the tonometer applied on the eye.

Since I have begun to measure the ocular drainage in animal and human eyes, I have become convinced that the mere measurement of intraocular pressure, while very helpful in the diagnosis of certain cases of glaucoma, is a procedure which may be incomplete and misleading unless the index of ocular drainage is measured at the same time. It is misleading in those cases which have only occasionally a high intraocular pressure. If the tonometer happens to be applied during one of the intervals when the o. p. is not above the normal limit, we may be induced to believe that the eye is normal. In fact, clinicians no longer rely upon a single examination. In suspicious cases, they have the o. p. measured repeatedly. It is not improbable that in some cases the examinations should be made during the intervals when the intraocular pressure is not high. In such cases, the mere taking of the o. p. with the tonometer is a crude and incomplete procedure.

K. Heilbrun (*Arch. f. Ophthalm.*, vol. xxix., 1911) and Stock (*Beilageheft zu Klin. Monatsbl. f. Augenheilk.*, 1910) have each published histories of patients who had low intraocular pressure during attacks of glaucoma. My experience fully agrees with that of Heilbrun who says: "The tension, which lies within the normal limits, may be abnormally high in cases which have had an abnormally low intraocular pressure before." The mere satisfaction of proving that the intraocular pressure of an eye is below 27mm Hg., i.e., within normal limits, is sometimes deceiving and such an examination is incomplete. On the one hand, a low intraocular pressure does not exclude the presence of glaucoma, because the examination may happen to be made during an interval of non-irritability or because the original o. p. of the eye, when normal,

was very much lower than the one now found. On the other hand, the measurement of the o. p. is interesting only in so far as it reveals the condition of the safety devices which such an eye possesses for keeping its draining system in good order. In other words, the measurement of the intraocular pressure alone throws some light upon the condition of the drainage system of the eye. This light is very dim, however, because the drainage capacity may be impaired to some degree and still the o. p. may not exceed the normal limit. (We report such instances in the second part of this paper.) Therefore, a correct idea about the normal condition or about the state of impairment of the mechanism regulating the intraocular pressure, can be obtained only when we consider both the intraocular pressure and the index of drainage of the ocular fluids. The elucidation of this point is of great importance in the early diagnosis of glaucoma, when the various complaints of the patient are vague and indefinite and the information furnished by a most careful examination is very doubtful.

I believe that the diagnosis in doubtful cases of incipient glaucoma might be cleared up at a stage when the ophthalmoscope, perimeter, and Bjerrum's curtain, etc., are of no avail.

The question of intraocular drainage measured on the eye in perfect physiological integrity (not on eyes punctured by a canula) has not been studied. The normal rate of drainage in human and animal eyes, the index of drainage in glaucomatous eyes at various stages, the influence of myotics, mydriatics, and cycloplegics on the drainage of ocular fluids, and the effects on the drainage of various surgical operations on the eye are some of the problems concerning the question of intraocular pressure.

We have examined the intraocular pressure and rate of drainage in 3 eyes of rabbits, in 7 eyes with normal o. p., in 3 eyes with suspicious glaucoma, in 4 eyes with simple glaucoma, in 4 eyes in which an iridectomy had been performed, in 2 eyes with simple glaucoma and retinal hemorrhages, in 2 cases of absolute glaucoma, in 1 with absolute glaucoma in which Dr. O. Schirmer had performed a resectio optico-ciliaris, and in 1 with secondary glaucoma and chronic irido-cyclitis.

As to the method of examination for the index of ocular

drainage, a correct technic is necessary and all possible precautions must be taken in order to avoid errors. The method which I have used in examining the rate of ocular drainage is as follows:

For rabbits, an assistant takes the rabbit on his lap and holding it stretched, fixes the head in such a manner that one eye is directed as nearly straight upward as possible. Another assistant, with a watch before him, records the initial intra-ocular pressure shown by the tonometer and the exact time in seconds at which the examination is begun. He then notes the number of seconds it takes the handle to move from the one division of the tonometric scale to the next one. The examination ends when the animal becomes restless or when the handle of the tonometer does not move while the instrument is applied for over 120 seconds. In human eyes the examination is made with the patient lying on a couch or a table.



## II

INTRAOCULAR DRAINAGE IN RABBITS.<sup>1</sup>

RABBIT 1. Intraocular Pressure and Ocular Drainage Measured in the Right Eye. Weight Used 7.5 gr.

December 20, 1911		December 20th Experiment repeated after 30 minutes		December 25th <sup>2</sup>	
<i>mm</i> Hg		<i>mm</i> Hg		<i>mm</i> Hg	
O. P.	22.	O. P.	26.		
30'' later	18.5	15'' later	22.		
120'' "	16.	100'' "	18.5	O. P.	16.
30'' "	13.	60'' "	16.	25'' later	13.
30'' "	16.	90'' "	13.		
25'' "	13.				
20'' "	11.5	10'' "	11.5	65'' "	11.5
20'' "	13-16.				
20'' "	13.	15'' "	10.	20'' "	10.
		170'' "	8.5	60'' "	11.5
		90'' "	6.5	95'' "	13.
				27'' "	10.
				53'' "	6.5 to 8.5
				15'' "	6.5
				25'' "	6.5

(Note: '' means seconds.)

The ocular drainage measured while the rabbit was under general ether anaesthesia gave following result:

O. P. 18.5<sup>3</sup>  
 5'' later 16.  
 300'' " no change

Rabbit 1. Intraocular pressure and ocular drainage measured in the left eye. Weight used 7.5 (unless otherwise stated).

Nov. 14, 1911. O. p. (under ether general anaesthesia) 26 to 30.5.

Jan. 3d. Ocular drainage test under local (holocain) anaesthesia, weight 5.5.

<sup>1</sup> Numerous measurements have been made; for the sake of brevity we reproduce only a few which illustrate the rate of ocular drainage.

<sup>2</sup> On the 21st of December I aspirated 0.5cc of vitreous from the eye and injected an equal quantity of physiologic salt solution. This explains why we find on Dec. 25th the intraocular pressure somewhat reduced.

<sup>3</sup> These numbers throughout the paper refer to *mm* Hg.

O. P.	6
8" later	5.5
75" "	4.5

Jan. 4th. Ocular drainage test about the same result.

Vitreous was aspirated for a purpose not connected with the subject of this paper and also in order to ascertain the changes of the intraocular pressure when vitreous is aspirated and replaced by physiological salt solution.

REMARKS: (A) The intraocular pressure decreased about 13mm Hg. after 0.4cc of vitreous had been aspirated and physiological salt solution injected instead.

(B) Under the influence of the (ether) general anæsthesia, the intraocular pressure increased from 6.5 to 22mm Hg.

(C) The measurement of the intraocular drainage on this eye revealed the interesting fact that in spite of its initial very low intraocular pressure (Jan. 3d and 4th) it took one day, 83 seconds to reduce the o. p. from 5.5. to 4.5, and the next, 176 seconds to reduce the o. p. 1.5 from 6.5 to 5.

Rabbit 2. Drainage of fluids of the right eye examined. Holocain used as a local anæsthetic. Weight used 7.5.

December 22d		December 22d (30 min. later)	
O. P.	30.5	O. P.	30.5
25" later	26.	135" later	26.
35" "	22.	105" "	22.
100" "	18.5		
90" "	16.		
December 22d (30 min. later)		January 3d.	
O. P.	18.5	O. P.	22.
55" later	16.	55" later	18.5
15" "	13.	12" "	16.
		33" "	13.

*Remarks:* We see the same apparent irregularity of the rate of ocular drainage as in the right eye of Rabbit 1. It is also important to note that during the time I have been studying the ocular drainage in the right eye of Rabbit 2, the left eye was passing through a panophthalmitis, due to an infection after an attempt to aspirate some vitreous. The evolution of the panophthalmitis did not seem to influence the o. p. or the index of the ocular drainage in the other eye.

I am not prepared to say why these very wide oscillations

occur in the index of drainage of the intraocular fluids, not only in different eyes, but even in the same eye. It seems logical to expect that the same weight applied on the same eye will press out the same amount of fluid each time, in the same length of time. In reality it is not so, and the above tables, though very few, are suggestive with regard to the variability and relative instability of the draining mechanism of the eye.

From this apparent inconstancy of the index of drainage of intraocular fluid, one important observation may be made, namely: **in all the eyes examined, drainage was present and fluid was expressed each time the tonometer was applied for a certain length of time.**

It will be seen later that this is not so in glaucomatous eyes.

### III.—MEASUREMENTS OF OCULAR DRAINAGE IN HUMAN EYES WITH NORMAL INTRAOCULAR PRESSURE.

On account of the readiness with which patients with optic atrophy, submit themselves to repeated examinations, I have measured the intraocular pressure and the ocular drainage in three patients with optic atrophy. Their intraocular pressure does not seem to differ from that of perfectly normal eyes and the findings have given me valuable data with which to compare the tables furnished by numerous examinations of the intraocular pressure and of the index of ocular drainage in six glaucomatous patients.

PATIENT 1.—K. A., 65 years of age. Complete optic atrophy in the right eye and incipient optic atrophy in the left eye. V. O. D. = perception of light. V. O. S. =  $\frac{2}{8}$ .

The intraocular pressure taken at various intervals during the time between May, 1911, and January, 1912, was found to vary between 16 and 26mm Hg.

The ocular drainage measured gave following results:

Jan. 8, 1912		Jan. 15, 1912		Jan. 15th (5 min. later)	
O. D.	16.	O. D.	16.	O. D.	13.
49" later	13.	15" later	13.	20" later	11.5
62" "	11.5	65" "	11.5	70" "	10.
52" "	10.			45" "	8.5

About a similar rate of drainage was found by repeated examinations on January 19th, April 1st, and June 19th.

During the time the patient was under observation, the

vision decreased gradually to zero in the right eye and to ability to distinguish movement of fingers in the left eye.

PATIENT 2.—Fr. V., 64 years old, tailor. Tabes, double optic atrophy (incipient). V. O. D. =  $\frac{2}{60}$ ; V. O. S. =  $\frac{2}{60}$ ; o. p. in both eyes varied during the first five months (Dec., 1911, to April, 1912) between 16 and 26.

#### OCULAR DRAINAGE TEST

Jan. 22, 1912			2 minutes later		
O. P.	O. D.	18.5	O. P.	O. S.	16.
15" later		16.			
80" "		13.	55" later		13.

PATIENT 3.—Ewald W., baker, 42 years old. Retrobulbar neuritis with incipient optic atrophy of both eyes. V. O. D. =  $\frac{2}{60}$ ; V. O. S. =  $\frac{2}{60}$ .

The intraocular pressure in each eye was between 16 and 26 during the first twelve months he was under observation.

#### OCULAR DRAINAGE TEST

O. P.	O. D.	18.5	O. P.	O. S.	11.5.
30" later		16.	104" later		10.
23" "		13.5			
53" "		11.5			
90" "		10.			
47" "		10.			

From the tables of ocular drainage tests made on these patients with optic atrophy (and with normal intraocular pressure) we see:

- (1) That in these eyes, as in rabbit's eyes, the time required for a given amount of intraocular pressure to descend a certain number of millimeters of mercury is not the same in every patient.
- (2) The same eye of the same patient does not exhibit the same index of drainage when examined at various intervals. (See tables.) In the first patient, the intraocular pressure went down from 13 to 11.5 in 62 seconds on January 8th, in 65 seconds one week later, in 70 seconds five minutes later, etc.

#### IV.—MEASUREMENT OF INTRAOCULAR PRESSURE AND DRAINAGE IN GLAUCOMATOUS EYES.

##### GROUP A—SIMPLE GLAUCOMA.

PATIENT 4.—A. K., 60 years of age. Chronic simple glaucoma. Vision with myopia corrected, O. D. =  $\frac{2}{70}$ ; O. S. =  $\frac{5}{70}$ .



On Jan. 31, 1912, the intraocular pressure was O. D. 82, O. S. 85. After the use of eserine for two days the o. p. fell to O. D. 22.5, O. S. 18.5.

During twelve months the intraocular pressure varied between 10 and 16 when the patient used a myotic. As soon as he stopped the use of pilocarpine in either eye the o. p. rose rapidly to 50 and 60.

Measurement of the ocular drainage.

Nov. 2, 1912. Patient stopped the use of pilocarpine in O. S. for last two days.

O. P.	O. D.	11.5	O. P.	O. S.	70.
20'' later		10.	120'' later		no change
70'' "		8.5			
70'' "	6.5 to	8.5			

Nov. 16, 1912. Patient had been using pilocarpine 1% solution, one drop *t. i. d.* in each eye.

O. P.	O. D.	11.5	O. P.	O. S.	18.5
30'' later		10.	8'' later		16.
			15'' "		13.
			15'' "		11.

Nov. 8, 1912. Has been using pilocarpine 1% in both eyes; stopped using the drops in O. S. for two days.

O. D.	26.	O. S.	50.
48'' later	22.	135'' later	no change
120'' "	18.5		

I instilled one drop of 1% solution of pilocarpine once in O. D. and every ten minutes for one hour in O. S. I then measured the ocular drainage.

O. P.	O. D.	13.5	O. P.	O. S.	13.5
35'' later		11.5	25'' later		11.5
20'' "		10.	37'' "		10.
50'' "		8.5	57'' "		8.5
50'' "		6.5	53'' "		6.5
55'' "		6.	55'' "		6.
25'' "	no change		30'' "	no change	

*Remarks:* The drainage system of the eyes of this patient seems to be in perfect order as long as a myotic is used and the pathological changes in the eye, wherever they may be, are very readily influenced by the use of pilocarpine. Parallel with the decrease of intraocular pressure we find an increase in the rapidity of ocular drainage. The tables under date Nov. 2, 1912, and Nov. 8, 1912, demonstrate very plainly how the ocular drainage suffers and grows less and less when the use of the myotic is stopped.

The readiness with which the ocular drainage is normalized and the intraocular pressure is reduced by the use of pilocarpine is strikingly indicative of the way these particular eyes will stand glaucoma. In this patient, neither the field, nor the acuity of vision has suffered during the year we have kept him under observation.

GROUP B. CASES WITH ABSOLUTE GLAUCOMA IN WHICH OCULAR DRAINAGE HAS BEEN MEASURED.

PATIENT 5.—D. R., 65 years old. O. D.: Absolute glaucoma. Resectio optico-ciliaris. O. S.: Chronic glaucoma, incipient cataract. Patient has been using 1% solution of pilocarpin in the left eye for several months.

Mar. 12, 1912. Ocular drainage test:

O. D.	36.	O. S.	22.
60" later	no change	30" later	16-18.5

We made the drainage test of the right eye at various times and obtained the same result: the pressure did not change no matter how long the tonometer was held on the eye. We hope to have occasion in the future to examine the drainage capacity of several glaucomatous eyes with resectio optico-ciliaris. This may throw some light on the question whether the intraocular fluids have some means of drainage via the optic nerve and its vessels.

PATIENT 6.—H. L., 58 years of age. Arteriosclerosis; glaucoma simplex, O. D. Multiple retinal hemorrhages.

Mar. 27, 1912. Patient has been using for several days 2% solution of pilocarpin drops in both eyes.

Ocular drainage test:

O. D.	36.5	no change after 60 seconds.	
O. S.	42.	"	"

April 1, 1912. Patient has stopped pilocarpin drops for twenty-four hours. Ocular drainage test:

O. D.	30.5	155" later	26.
O. S.	36.	175" "	30.5

Instillation of pilocarpine 2% drops in each eye every five minutes for 45 minutes then ocular drainage tested:

O. D.	36.5	120" later	30.5
O. S.	50.5	17" "	42.
		75" "	no change

*Remarks:* On March 27th, the drainage was nil. The application of the tonometer (weight 10) for 60 seconds did not reduce the tension although the patient had used 2% pilocarpin for several days previously.

On April 1st the ocular drainage was still very deficient since it took the o. p. of the right eye 155 seconds to recede from 30.5 to 26, and that of the left eye 175 seconds to recede from 36 to 30.5.

PATIENT 7. Morris R., 59 years old. O. D.: Old irido-cyclitis, secondary glaucoma. O. S.: Chronic simple glaucoma. Coloboma iridis artefactum.

V. O. D. = 0. V. O. S. =  $\frac{1.0}{200}$ .

April 21, 1912. O. p. O. D. 62. O. p. O. S. 42.5 to 50.5.

April 23, 1912. Patient has used pilocarpine 2% solution drops in both eyes three times daily, O. p. O. D. 42.5. O. p. O. S. 36.5-42.

Ocular drainage test: After having the tonometer applied on each eye for 60 seconds, the o. p. remained unchanged.

April 25th. The patient has been using pilocarpin 2%, one drop every one or two hours. O. p. O. S. 36.5 to 42.5. Drainage test, no change after 60 seconds. In this patient as in Case 6 of this group the ocular drainage could not be influenced by the use of myotics.

PATIENT 8. A. N., 58 years old. O. D.: Chronic glaucoma; coloboma iridis artefactum. O. S.: Absolute glaucoma.

March 3, 1911. O. p. O. D. 62.5mm Hg. O. p. O. S. 85.5. The frequent use of pilocarpin, 2%, until April 11, 1911, reduced the o. p. to O. D. 36.5, O. S. 50.5.

Drainage test: No change of tension in either eye during 100 seconds, while the tonometer was continuously applied.

*Remarks:* In this case, contrary to what we have seen in patient 1, the use of myotics could not re-establish a normal ocular drainage.

#### GROUP C. MEASUREMENT OF OCULAR DRAINAGE IN PATIENTS WITH SUSPICIOUS GLAUCOMA.

PATIENT 9. Meyer R., 68 years old. O. S.: Absolute glaucoma; coloboma iridis artefactum. O. D.: Slight

hyperopic astigmatism. Glaucoma (?). Intraocular pressure at first was:

O. D.	18.5 to 22
O. S.	36.5 to 39.5

Drainage test, Feb. 7, 1912:

O. P.	O. D.	18.5	O. P.	O. S.	30.5
25"	later	16.	33"	later	26.
45"	"	13.	90"	"	no change
40"	"	11.5			

Mar. 22, 1912. Patient has been using pilocarpine drops in the left eye since February 7, 1912. He is complaining that once in a while the right eye feels uneasy.

O. P.	O. D.	18.5	O. P.	O. S.	30.5
60"	later	no change	50"	later	26.

Sept. 4, 1912:

O. P.	O. D.	22.	O. P.	O. S.	23.
120"	later	18.5	60"	later	20.
			60"	"	no change

It is interesting to note that the right eye with the same intraocular pressure (18.5) on February 7th and March 22d, exhibited a normal capacity of drainage at the first examination and almost a complete stoppage during the second examination. The complaint of the patient of feeling an uneasiness in the right eye (the good eye) and the momentary impairment of the normal drainage are the only points leading us to suspect a prodromal stage of glaucoma in the good eye. Otherwise, neither the ophthalmoscope and field of vision nor the measurement of intraocular pressure would give us any help in the diagnosis.

PATIENT 10. L. B., 65 years old. General arteriosclerosis neurasthenia. O. D.: Absolute glaucoma. O. S.: Glaucoma(?).

Aug. 16, 1911. O. P. O. D. 62. O. P. O. S. 16.

Mar. 2, 1912. Patient complains of occasional slight pains and blurring of vision in the good eye. The measurement of the ocular drainage shows:

O. P.	O. D.	60.	O. P.	O. S.	26.
50"	later	no change	10"	later	22.
			65"	"	22.



Apr. 10. 1912. Patient complains that her sight in the good eye (left) becomes dim occasionally and the eye hurts her sometimes. Has been using pilocarpin 1% drops on each eye until two days ago when the myotic was discontinued.

V. O. S. counts fingers at 30 feet (maybe more; patient is illiterate and stupid). Field of vision normal.

Measurement of ocular drainage:

O. P.	O. S.	18.5
60" later		no change

*Remarks:* In this case the question was whether the left eye is just starting on the same glaucomatous career as the other eye (with absolute glaucoma) did two or three years ago. Aside from the very indefinite complaint of the patient, that her vision is occasionally dim, we had no reason to think beginning of a glaucoma in the good eye. The acuity and field of vision, as far as could be determined in this patient, were normal and not receding during the ten months we have had her under observation. The pupil reacted well to light and accommodation and the fundus showed nothing abnormal. The i. o. pressure was always "within the normal limits" (16-26). The only disquieting phenomenon was the impairment of the ocular drainage on March 2 and April 10, 1912.\*

PATIENT II. J. H., 36 years old, nurse, on Feb. 9, 1912, complained that she has suffered from headaches for about three months and that the pains are most severe around the left side of the forehead and temples. Sometimes she sees various colors around the gas flame, if she closes the right eye. V. O. D. =  $\frac{2}{30}$  plus; O. S. =  $\frac{2}{30}$ . Field of vision for white about 20 degrees concentrically contracted in the right eye and about 30 degrees contracted in the left eye. On the nasal side (left eye) field contracted to about 10 degrees from the fixation point. The error of refraction was carefully corrected. Intraocular pressure felt with the finger seemed normal. With tonometer O. D. 22, O. S. 26-30.5. Both disks showed a deep physiologic excavation.

Feb. 26, 1912. Patient has been using one per cent. solution of pilocarpine in the left eye until the night before, when advised by a neighbor she went to another physician to have her eyes examined. A mydriatic was used and the patient came next day to the clinic with both pupils widely dilated.

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\* I saw the patient again during Jan., 1913, suffering from an acute glaucoma of the left eye.

## Ocular drainage:

O. P.	O. D.	22.	O. P.	O. S.	26.
15" later		16.	60" later		22.
60" "		no change	60" "		no change

The drainage capacity of these eyes does not seem to be normal. In rabbit's eyes and in normal human eyes, the O. P. shows a greater readiness to descend while the tonometer is being steadily applied, than was noted in this patient's eyes. In these two patients the intraocular pressure as given by the tonometer was within the normal limits. Yet, the rate of ocular drainage, another element just as important, if not more so, was not normal.

March 8th. Patient has used 1% solution of pilocarpin drops in the left eye.

## Ocular drainage:

O. P.	O. D.	16.	O. S.	22.
35" later		13.	65" later	no change
25" "		11.5		

Drainage has improved in the right eye, but not in the left one.

March 22d For four days patient has discontinued the pilocarpin drops in the left eye.

## Ocular drainage:

O. D.	18.5	O. S.	22.
45" later	16.	45" later	18.5
30" "	13.5	45" "	no change

The left eye shows right along less capacity for drainage and a higher intraocular pressure than the right eye.

Mar. 29, 1912. Patient has not used pilocarpine drops for about 11 days.

## Ocular drainage test:

O. P.	O. D.	13.	O. P.	O. S.	22.
40" later		11.5	75" later		18.5
50" "		10.	100" "		no change

## June 17, 1912, ocular drainage test:

O. P.	O. D.	16.	O. P.	O. S.	22.
13" later		13.5	120" later		no change
65" "		11.5			
65" "		10.			

The left eye shows right along lower capacity for drainage and a higher intraocular pressure than the right eye.

*Remarks:* This patient is interesting on account of the difficulty experienced in deciding the presence or absence of glaucoma in the left eye. She gave a history suggestive of prodromal glaucoma: occasional pains in the left eye, dimness of vision, the seeing of various colors around the gas flame. The field of vision was about 20 degrees concentrically contracted in both eyes, but more limited nasally on the left eye. Both disks were deeply excavated (physiologic excavation?). On the other hand she was markedly neurasthenic and too much importance could not be attached to her complaints. Her vision was good and could be improved to  $\frac{20}{30}$  plus with glasses. The intraocular pressure was within the normal limits in both eyes. The opinions of other two ophthalmologists (A and B) of very wide experience was respectively, A: "No glaucoma"; B: "Glaucoma."

The careful study of the behavior of the intraocular pressure in the eyes of this patient and the repeated measurement of the ocular drainage, made the suspicion of prodromal glaucoma very plausible. The reasons are:

A—The intraocular pressure of the two eyes was always found to be different. Those who have made careful examinations of the intraocular pressure in a large number of cases have gained the knowledge that the intraocular pressure is usually the same in both eyes. K. Heilbrun (*Arch. f. Ophth.*, vol. lxxix., 1911), reviewing the findings of Schiötz, Stock, Langenhan, Marple, and Wegner, and his own experience, says, that the i. o. pr. is generally equal in both eyes. He could find only occasional small differences in intraocular pressure of 1–2mm Hg., which is within the possibilities of a slight error. Wegner alone found a difference of 8mm Hg. in a pair of normal eyes. In the case of Wegner, however, I could not regard both eyes as normal, because one of them had a o. p. of 30, which is above the normal limit.

B—The ocular drainage test in our patient showed that while the intraocular pressure of the right eye presented a certain readiness to recede when the tonometer was steadily applied, the intraocular pressure of the left eye, under the

same test, did not decrease at all, at times, or it decreased at a much slower rate.

*The mere fact that the intraocular pressure of an eye is within "normal" limits cannot be considered as conclusive, in my opinion, with regard to the question whether that amount of intraocular pressure is normal. This can be determined only by a comparison of the intraocular pressure and of the draining test of one eye with that of the other.*

Another patient in a class by himself is the following:

PATIENT 12. M. L., 38 years old. Simple glaucoma O. S. Coloboma iridis artefactum.

June 1, 1912. O. p. O. D. 50.5mm Hg. O.S. 30.5.

June 2, 1912, has been using, for 24 hours, pilocarpin 2% solution, four times daily in each eye. O. p. O. D. 36.5. O. p. O. S. 30.5. We instilled into each eye one drop of a 2% solution of pilocarpin every fifteen minutes for one hour, then we measured the o. p. O. D. 42.5, O. S. 22.

June 14, 1912 has been using pilocarpin 2%, four to five times daily in each eye.

Ocular drainage test:

O. D.	60.	O. S.	26.
50" later	51.	22" later	22.
120" "	no change	120" "	no change

June 17, 1912. Patient has been using pilocarpin drops almost every hour during the daytime.

Ocular test:

O. D.	27.	O. S.	22.
120" later	no change	32" later	18.5
		72" "	16.
		15" "	no change

*Remarks:* The myotic has reduced the intraocular pressure in the right eye from 60.5 to 27 and the patient assured me that in three years he has not seen as clearly as now. The ocular drainage however was not so greatly influenced. In the left eye with the iridectomy, the myotic reduced the o. p. and improved the rate of drainage. The right eye, as we see, responds readily to the myotics by a reduction of the intraocular pressure, but by no improvement of the drainage capacity.

Of the three groups of patients with glaucoma, the third one is the most interesting. The measurement of intraocular



pressure and ocular drainage is important mostly for the establishment of a diagnosis in suspicious cases of glaucoma. In this group of cases in which the measurement of acuity and field of vision, as well as the ophthalmoscopic examination, could not advance the diagnosis even one step further, the method of measuring the rate of ocular drainage is perfectly welcome if it can help throw any light on the condition of these eyes. It is interesting to note that while the o. p. in these eyes with suspicious glaucoma is within normal limits, the measurement of ocular drainage shows a reduced rate.

#### SUMMARY

The degree of intraocular pressure depends in a great measure on the integrity of the draining system of the eye, and the examination of the rate of ocular drainage is of more importance than the simple measurement of the intraocular pressure. The rate of ocular drainage can be measured by the aid of the Schiötz tonometer in animal and human eyes with a certain amount of accuracy.

Normal eyes have an ocular pressure and a rate of ocular drainage varying within relatively wide limits; glaucomatous eyes have some impairment in the function of the draining system. It is safe to suppose that in incipient or prodromal glaucoma, the draining system may be undergoing slight alterations which, though too small to raise the intraocular pressure above the upper limit of the normal, yet sufficient to be discernible by the measurement of the rate of ocular drainage. There are patients with eyes in a condition of latent glaucoma in which the intraocular pressure is within normal limits—about 15 to 26mm Hg. The diagnosis in such cases can be cleared up to a certain extent by the measurement of the rate of ocular drainage.

## UNUSUAL DURATION OF MENTAL SYMPTOMS IN A CASE OF ATROPINE POISONING.

By CHARLES W. BURR, M.D., PROFESSOR OF MENTAL DISEASES,  
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THE point of interest in the following case is the long duration of mental symptoms, six weeks, in a patient who had been using atropine in the eyes. To save space, and because they were in no way unusual, I shall omit a description of the physical symptoms of atropism she exhibited.

Slight cases of atropine poisoning may present no psychical symptoms though, as a rule, there is a little mental confusion. On the other hand, an amount of the drug which, in the average man, does not produce any untoward effect may, in susceptible people, cause visual hallucinations or illusions of the unreality of which the patient is completely aware. I have seen one case in which the visual hallucinations were experienced only in the predormitium. It occurred in a man who had been ordered small doses of atropine twice daily, by mouth, for a nervous affection. The first night after taking the drug he began to see, while half awake, a spectral human head which changed from moment to moment. He realized its unsubstantiality and it soon passed away and sleep came on. It returned at the same time for several nights and, as he was beginning to worry somewhat, I stopped the drug though no other symptoms had appeared. The hallucination immediately ceased to trouble him. He had never had such an experience before. The only physical symptom he had was slight dryness of the throat coming on as I remember, though my memory is not entirely

accurate about this, about half an hour after taking the drug and lasting about an hour. I suspect that all drugs which produce hallucinations act more promptly and, if one may say so, more easily, on the half-sleeping brain than on one wholly awake. Theoretically this ought to be true; the unemployed brain, and even in the most unintellectual the brain is doing some kind of work (consciously or subconsciously, or perhaps wholly unconsciously) continuously in waking hours, ought to be more susceptible to drug stimuli acting on the centres of the special senses than one employed. My patient could, by thinking of something else, make the vision disappear, but the act of thinking at the same time made him awake completely.

In cases of serious poisoning by atropine the mental symptoms are very marked and characteristic. The picture is the same whether belladonna or its alkaloid has been taken and no matter what the method of administration. The symptoms come on, when once they appear, very rapidly. There is delirium, in severe cases, of the wildest kind, visual and auditory hallucinations and, as a rule, in the fatal cases, convulsions and coma. There is some dispute as to the emotional tone most commonly present in the delirium, some authorities stating that more patients are woful and grief-stricken, others that extreme joy and exhilaration are more frequently seen. The characteristic visual hallucinations are of animals, especially cats, dogs, rabbits, butterflies, and such small fry. Sometimes disgusting, crawling things are seen, but not commonly. Spectres of people, though not infrequent, seem, as a rule, not to be attended to by the patient as closely as those of animals. There may also be seen spectral inanimate objects, but they attract the attention of the patient but little. There is a difference of opinion as to the effect of the drug on the sexual feelings. Some authors speak of marked eroticism, others deny its occurrence, and still others ignore it entirely. All are agreed that priapism is frequent whether with or without emotion. It is possible that some reporters have assumed the existence of eroticism because of the presence of priapism. This is an unjustifiable assumption since, in many disorders, the latter condition is present in the absence of the former. Wakefulness is common.

In the great majority of cases death or recovery occurs within twenty hours. In patients who recover, the symptoms often pass off in a few hours.

The history of the case follows:—M. J., a 52-year-old woman, was admitted to the Philadelphia General Hospital (Blockley) in a state of great excitement and exhilaration and showing visual and auditory hallucinations. Her family physician told me that nine weeks before admission she had been seized with iritis for which instillations of three drops of the standard atropine solution every three hours had been ordered. She continued to use the drops, on her own responsibility, till the day before admission to the hospital, when she suddenly became excited and hallucinatory. His statement was positive that the symptoms came on suddenly and attained their height at once. Her previous medical history was good. She never used alcohol, had never had any mental disorder, and was never even nervous. She was an industrious and thrifty working woman, of a commonplace unemotional type, and not, he assured me, likely to allow her imagination to run away with her: she did not have enough imagination for that.

I examined her two days after her admission. She was a thin, poorly nourished, elderly woman. The excitement had somewhat passed off but she was over-content, almost hilarious, and had no realization of being mentally ill. For twenty-four hours after admission it had been necessary continuously to restrain her physically on account of her extreme restlessness, but need of this had passed off by the time of my visit except that for several nights she had to be fastened in bed as otherwise she would have bothered the other patients. She did not wish to harm them, but would not let them alone. As happens quite frequently in excited patients, physical restraint caused comparative mental quiet without any of the evil effects that often follow the administration of sedatives in sufficient dose to be effective. Though she was almost totally blind she did not realize it. She had both visual and auditory hallucinations. She was not annoyed by them, had no idea of their incongruity, and believed them to be real. She saw people bringing tubs into the room and pulling the furniture down and heard them talking among themselves. They never spoke to her, nor of her, nor was she in any way bothered by their talk. Indeed she paid little attention to what they said. She was very much more impressed by, and interested in, the animals she saw. She constantly saw cats and dogs and rabbits. Rabbits crawled over her bed, cats and dogs played and



fought. "They had taken possession of her house." She liked to play with them and with hands really empty fondled them. At this time she had no realization that she was in a hospital but thought she was in her own home.

Several days later she became mentally quiet enough to make it possible to hold her attention for a short time, and she would then answer correctly questions about her early life and even about the first few days of her eye trouble, but she was entirely confused concerning events later than about seven weeks before her admission. There was, in other words, failure of memory for events immediately preceding the onset of the symptoms, mental confusion, and loss of power to fix attention. She remembered, for example, that she had put drops in her eyes every three hours for several days, but she could not remember when, nor what the drops were for. It was not possible for her to talk responsively for any length of time. Soon her power of attention would fail and she would return to her talk about the dogs and cats. She paid no attention to her dimness of vision and did not regard it as at all important that she could not clearly see the physician she was talking with and that the room looked dark to her. It was not at all strange to her that though she saw the animals clearly all else was blurred and indistinct. The hallucinations continued both night and day. So far as I could tell, they continued present with the eyes closed. After the first few nights she slept well but even during convalescence the hallucinations were most marked in the evening. She was entirely indifferent to her actual surroundings and careless and unconcerned about not seeing her own people.

After she had been in the hospital a few days she began to have falsifications of memory and to "fabricate," or rather these symptoms became noticeable; during the first few days the delirium was too great, the flight of ideas too rapid, for her to fix attention on any one thing long enough to fabricate, though potentiality to fabrication was probably present from the start. Later it became kinetic. She then recognized me as an old friend (I had never seen her) and talked about visits I had paid her. Though really in bed all the time, she told a tale of having been out walking the day before and of having met some soldiers. Some days later, when most of the time she realized she was in a hospital, she told, speaking in a very matter-of-fact way and evidently believing it, the following story: While at home some one put her on the fire escape. (Her home is not fitted with a fire escape.) She went down to the street and walked about all night. Next day she met a couple of officers who after some harmless adventures took her to

the hospital and when she got there she found the bed moving around without any one having their hands on it. The whole story, told here in briefest outline, was imaginary, and was related in a quiet matter-of-fact and yet interesting way, as if it were an every-day experience. When she regained her normal mental state, her power of imagining was so small that she could not have invented such a story. As time passed, the hallucinations became less vivid and less constant, and after she had been in the hospital about two weeks they recurred only now and again daily for a few minutes at a time. Her falsification of memory and "fabrications" became at first more marked as the hallucinations decreased in intensity and later themselves slowly ceased. Excitability and hilarity varied a great deal from day to day but the tendency was to become quieter and quieter. The hallucinations and the other mental symptoms did not entirely clear up till six weeks after her admission and after she had been home some time. She had neither convulsions nor a period of coma during her illness. There was no sexual element in her delirium.

Alcohol occasionally produces the clinical picture described above, but it can be excluded in this case with certainty. Syphilis too might possibly be suspected, but she not only had a negative history, given by a physician who knew her well, but showed no physical signs of present or previous infection. Her vascular and renal systems were in good condition. Had the mental disturbance lasted only a day or two, the picture was so characteristic that no one would have had the slightest doubt about the diagnosis. That she was poisoned by atropine the physical symptoms proved beyond doubt. After considering the whole matter I am forced, notwithstanding the prolonged duration of the illness, to the diagnosis of pure atropine poisoning without any other contributing factor.

## REPORT OF A CASE OF CONICAL CORNEA SUCCESSFULLY TREATED BY THE ACTUAL CAUTERY.<sup>1</sup>

By DR. WM. CAMPBELL POSEY, PHILADELPHIA.

MISS G., *æt.* 25, was referred to the writer by Dr. Wm. F. Weitzel, of Indiana, Pa., in March last, on account of poor vision occasioned by the presence of conical cornea in both eyes. As is usual, there was nothing in the patient's history to throw any light upon the etiological factors which had operated to induce the condition. The vision in both eyes was apparently good in early childhood, but had steadily deteriorated as the patient grew older. Examination showed a conicity of both corneæ, the deformity being, however, much more pronounced in the left eye. Both corneæ were clear and the apices of the cones were situated a little below the pupillary centre in each eye and somewhat to the temporal side. The eye-grounds were normal. With  $-1.25$  D.  $+6$  cyl. ax.  $160^\circ$ , vision in the right eye equalled  $\frac{5}{12}$ , but it was impossible to improve the vision in the left eye more than to  $\frac{3}{100}$ , and no glass enabled the patient to see even the largest type on the reading card. As the vision in each eye had been steadily failing and it was manifest that that of the right eye would soon be as bad as that in the left, operative procedure was advised, and the consent of the patient being obtained, she was accordingly admitted to the Howard Hospital.

Following his convictions regarding the best means of proceeding in such cases, the reason for which will be presently given, after thorough cocainization of the left eye, the writer cautiously but thoroughly cauterized the temporal base of the cone, the apex being but slightly touched with the hot metal. The area cauterized comprised about one-sixth of the entire structure of the cornea and was triangular in form, the apex corresponding to the summit of the cone, the base to a position in the cornea about 2mm distant

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<sup>1</sup> Read before the Section on Ophthalmology of the College of Physicians of Philadelphia on December 19, 1913.

from the limbus and parallel with it. A large strabismus hook heated over an alcohol flame was employed as the cauterizing instrument, its tip being applied at a red heat. After thorough atropinization, the conjunctival cul-de-sac was filled with iodoform ointment and a firm compress bandage applied. Healing was uneventful but protracted, though cicatrization was favored by the presence of a number of blood-vessels which invaded the cauterized area from the neighboring limbus. At the end of six weeks, the reaction occasioned by the operation had subsided sufficiently to permit the patient to return home, without, however, an attempt being made to order a correcting glass for the operated eye.

After a period of seven months, the patient returned, highly pleased with the result of the operation, averring that she could now read ordinary newspaper type and that her vision, even without a glass, was excellent. When tested, uncorrected vision in the left eye was found to equal  $\frac{5}{2}$ , and with  $-1. + 3.5$  cyl. ax.  $35^\circ = \frac{5}{1\frac{1}{2}}$ . Type 0.75 D. was read without a glass, and with the above correction, type 0.50 D. Vision in the unoperated eye, however had markedly fallen, being less than  $\frac{5}{100}$ . The operated eye, was entirely quiet, though somewhat disfigured by the presence of the scar tissue. At least a half of the pupillary area of the cornea was uninvolved by the opacity, however, and as the edge of the macula was dense and defined from the surrounding corneal tissue by a sharp line of demarcation there was no disturbance of vision by aberrant refraction. Tattooing was advised, but not insisted upon, the operator being as well satisfied as the patient with the visual results and being desirous, as was she, of subjecting the right eye, to a similar operation. This was accordingly done, in precisely the same manner as that just described; the healing process in this eye was less protracted and the patient was permitted to return to her home at the end of three weeks. A recent letter states that the result of the operation upon the right eye is equally as good as upon the left. It is the intention of the patient to come to Philadelphia some time later in the winter, when the writer will endeavor to present her before the Section. Tattooing of the left cornea will probably be performed at that time also.

In most instances, vision in conical cornea can be satisfactorily improved by high cylindrical lenses; in some cases, however, as in that which has just been cited, the conicity and distortion of the cornea is so great that lenses are useless, and operation is demanded.



The surgical measures which have been instituted by operators from time to time, for the relief of advanced cases of conical cornea, have been varied and may be divided into two classes: (1) those which aim to improve vision by either an iridectomy, iridodesis, and iridotomy without attempting to change the shape of the cone; and (2) those which have been designed to flatten the conicity of the cornea, either by excision of circular areas and ellipses of the membrane either in conjunction with or without cauterization, or by cauterization alone.

The results attendant upon the creation of an artificial pupil without previous operation to flatten the conicity of the cornea, have been so unsatisfactory that they are but in little favor at the present time, while the removal of a segment of the cornea is attended with such danger, not only on account of the likelihood of injury to the lens by the instrument employed in the excision, but also by reason of the complications arising in the healing from the thinness and malnutrition of the cornea, that cautious surgeons regard this method of procedure also with considerable apprehension regarding the ultimate result.

Most operators, therefore, favor some form of cauterization, aiming to substitute by this method a resistant and flattened cicatrix for the attenuated apex of the cone. According to both Oliver and Nance in Wood's *System of Ophthalmic Operations*, von Graefe was the first to employ this plan of procedure, cauterizing the conic apex, which he had first scarified with a cataract knife, by repeated applications of nitrate of silver. Care was taken that the cornea was not perforated, though in some cases the aqueous humor was evacuated by a paracentesis, made every few days over a period of about two weeks. A bandage was applied until the healing process was well advanced. At times the resulting scar covered the pupil and iridectomy was necessary.

In later years, the cauterizing agent has usually been the galvano-cautery, and operators vary in their methods only in the extent of the area cauterized and in their treatment of the contents of the anterior chamber, some perforating into the chamber with the cautery at the time of the cauterization, while others have tapped the chamber by paracentesis some

days later. There are those, on the other hand, who see no necessity for emptying the chamber, thinking that this procedure needlessly complicates without aiding in the subsequent flattening of the scar tissue.

After a careful consideration of the views of different operators and from the study of several of his own cases, as well as others of his colleagues, notably of one most successful case reported by Dr. P. N. K. Schwenk, the writer believes that success from cauterization lies in replacing the greater part of the cone by a mass of firm connective tissue, which should be so placed that the traction exerted by the scar in the process of healing is sufficient to resist the intraocular pressure, while its density should be great enough to prevent rays of light from penetrating it, thereby reducing aberrant refraction. As the apex of the cone seldom occupies the pupillary centre, the resultant scar need not entirely block the pupil, so that iridectomy, is as a rule, unnecessary. As Elschnig has pointed out, prompt vascularization of the cauterized mass is most desirable, and the writer follows his advice to connect the wound in the cornea with the conjunctiva by carrying the cauterization almost to the limbus. The writer also believes in the graduated application of the cautery as advocated by Sir A. Critchett and H. Knapp, although like Sgrosso he cauterizes the temporal wall of the cone as deeply as possible, the apex being burned but slightly. A firm compress bandage is essential to support and flatten the cornea, and should be maintained for several weeks (after the operation). It should, however, be removed twice daily to permit of flushing the eye with boracic acid lotion, for the instillation of atropine, and for a copious enunction with iodoform ointment.

Subsequent tattooing of the corneal scar for cosmetic purposes is, of course, optional with the patient. Should the scar tissue, however, be not sufficiently dense in places, and should the rays of light pass through it, the implantation of a thick layer of pigment into the scar, thereby absorbing such rays, should be of value in still further improving visual acuity.



ILLUSTRATING DR. VERHOEFF'S ARTICLE ON THE EFFECT OF CHRONIC GLAUCOMA  
ON THE CENTRAL RETINAL VESSELS.

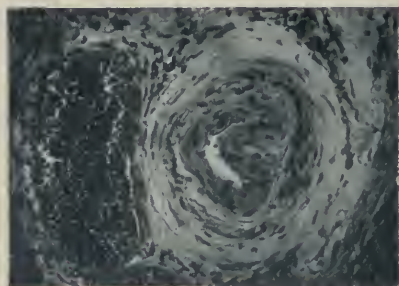


FIG. 1. Endarteritis of central retinal artery in secondary glaucoma, showing infolding of actively proliferating intima.

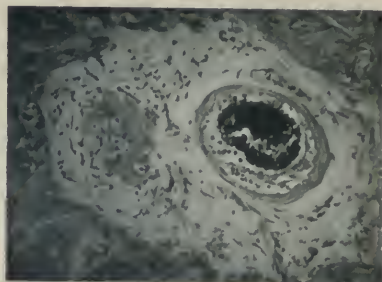


FIG. 3. Endovasculitis of central retinal vessels in secondary glaucoma. The vein on the left shows proliferation of its intima with papillary projections into the lumen. The artery shows fatty endothelial cells in its intima.

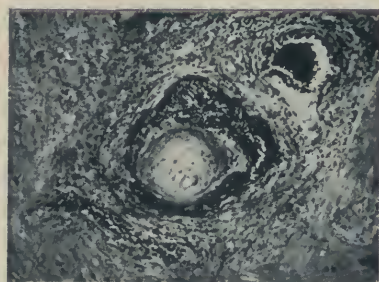


FIG. 2. Dissecting aneurism of central retinal artery. There is a central tube with obliterated lumen, surrounded by a space filled with blood. In subsequent sections a branch is seen entering this space.

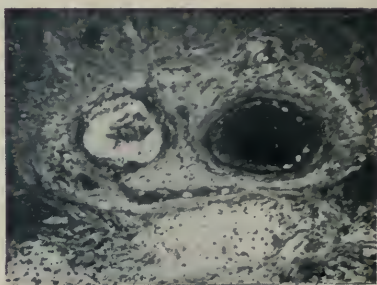


FIG. 4. The central retinal vein, on the left, shows an unusual form of dissecting aneurism. There is a central hyaline tube with obliterated lumen, surrounded by a space filled with blood from a branch entering below. Note similarity to artery in Fig. 2.



## THE EFFECT OF CHRONIC GLAUCOMA ON THE CENTRAL RETINAL VESSELS.

By F. H. VERHOEFF, A.M., M.D.

FROM THE MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY.

*(With four illustrations on Text-Plate V.)*

THE effect of chronic glaucoma, either primary or secondary, on the central retinal vessels has not hitherto been determined. In cases of primary glaucoma, it is true, these vessels have frequently been found affected, but here it has been assumed that the vascular changes have been part of a general angio-sclerosis upon which the glaucoma itself was perhaps dependent. On the other hand, the effect of secondary glaucoma on the central vessels has not previously been investigated, although obviously the results obtained would apply also to primary glaucoma. For in a series of properly selected cases of secondary glaucoma, it is evident that whatever changes are found in the central vessels must, in general, be dependent directly or indirectly on the increased intra-ocular pressure. It is the purpose of this paper briefly to summarize the findings in such a series of cases.

The material for this investigation consisted of all available eyes in this laboratory from cases of secondary glaucoma due to lesions of the anterior portion of the globe. Many eyes were not available because the optic nerves had already been sectioned longitudinally. Only cases with definite cupping of the optic disk were included, so as to allow no doubt as to the presence of glaucoma, and care was taken to exclude all cases in which the clinical records indicated the least probability of primary glaucoma in either eye. Cases with retinal hemorrhages were not excluded, but of these there

were only three. So far as concerned changes in the central retinal vessels, these cases comprised an unselected series.

The fixation was in 10% formalin followed by a saturated solution of potassium bichromate for twenty-four hours. In every case serial celloidin cross-sections were made through the region of the lamina cribrosa by the method described by me elsewhere,<sup>1</sup> and stained, usually by my elastic tissue stain,<sup>2</sup> which is also an excellent nuclear stain.

The total number of cases was 39. The causes of the glaucoma were: *occlusio pupillæ*, 8 cases; anterior synechia, 19 cases (corneal ulcer 6, injury 13); anterior staphyloma, 8 cases; cataract extraction with incarceration of lens capsule in wound, 2 cases; serous iritis, 1 case; small sarcoma of the ciliary body with metastases in the filtration angle, 1 case.<sup>3</sup> The ages were: 1 to 10 years, 5 cases; 10 to 30 years, 7 cases; 30 to 50 years, 19 cases; 50 to 70 years, 8 cases. The durations of the cases, estimated by the time elapsed since the corneal ulcer, injury, etc., were: less than 2 years, 13 cases; between 2 and 10 years, 17 cases; between 10 and 20 years, 7 cases; over 20 years, 2 cases.

Microscopic examination of the central vessels in the above cases showed that in every case one or both of the central vessels were affected with endovasculitis, in the region of the lamina cribrosa. The vein was the more affected in 19, the artery in 15 cases, while the two vessels were equally affected in 6 cases. In 7 cases the vein, and in 3 cases the artery, was normal. In 8 cases there was complete, and in 5 cases almost complete, obstruction of the central vein. In 4 cases there was complete, and in 2 cases almost complete, obstruction of the central artery. In 2 cases there was complete or almost complete obstruction of both vessels. In general, therefore, the vein was the more greatly affected of the two central vessels. In 8 cases it is noteworthy that the central vessels were only slightly affected in spite of the fact that in each the glaucoma was in an advanced stage with deep cupping of the disk.

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<sup>1</sup> "Obstruction of the Central Retinal Vein." *ARCHIVES OF OPHTHALMOLOGY*, 1907, xxxvi., 32.

<sup>2</sup> "An Improved Differential Elastic Tissue Stain." *Journal American Medical Association*, 1911, lvi., 1326.

<sup>3</sup> Reported in full in *Ophthalmology*, July, 1908.

Retinal hemorrhages were present in only three cases, each showing complete obstruction of the central vein. In none were they as abundant as is usual after primary obstruction of this vessel.

In the first of these cases (2—2005) there was only one punctate hemorrhage, near the macula, advanced atrophy and moderate oedema of the retina. The vein showed a thick hyaline wall and its lumen was occluded by active cellular subendothelial proliferation. The lumen of the artery was reduced to about half its normal size by endarteritis. The patient, aged 43 years, had received a perforating wound of the cornea and lens fifteen years before, the secondary glaucoma evidently being due to incarceration of the lens capsule in the wound following extraction of the traumatic cataract.

In the second case (2—1217) there were a few punctate hemorrhages near the disk and macula. The optic disk showed only moderate cupping with cavernous atrophy. The retina showed only slight atrophy, many multipolar ganglion cells still being recognizable, and slight edema. The vein was completely occluded in only a few sections, by active subendothelial proliferation. The artery was only slightly affected. In this case there was a leucoma adherens and traumatic cataract due to a perforating injury with a stick of wood one year previous to enucleation. The patient was aged 60 years.

In the third case (2—2014) punctate retinal hemorrhages were fairly numerous in the region of the equator and there was slight retinal oedema. Multipolar ganglion cells were still present in the macula, and the optic disk was only moderately cupped. The vein showed a hyaline wall and the lumen completely occluded by a relatively active subendothelial proliferation. The artery was only moderately affected but showed a dissecting aneurism. The patient, aged 43 years, two years preceding the enucleation had an attack of ulcerative keratitis following malaria, with Saemisch operation and resulting leucoma adherens.

In four cases there were expulsive subchoroidal hemorrhages occurring spontaneously in three and after optical iridectomy in one. In one of these the central vein, and in two the artery, was almost completely obstructed.

Age was apparently not an important factor in determining the degree of endovasculitis or its preponderance in the vein or artery. This seemed to be true also of the duration, but

here, of course, the duration of the effective increase of tension may often have been less than that of the causal lesion. About the only definite conclusion that can be drawn in regard to age and duration is that in young individuals secondary glaucoma never produces marked changes in the central vessels in as short a time as is sometimes seen in old individuals.

As regards the character of the changes in the central vessels, essentially the same types were met as those that have been described in the literature, and that I have myself observed as occurring in hemorrhagic glaucoma. In no case was there any evidence of thrombosis, though in some cases without the aid of serial sections the changes might have been mistaken for thrombosis with organization. In the artery the simplest change was a subendothelial proliferation of spindle cells, usually more marked on one side, sometimes associated with the formation of collagen and elastic tissue. At intervals the elastic tissue became condensed, so that in some cases as many as three or four concentric elastic membranes were present. This would seem to indicate that the process was intermittent. The cells immediately about the lumen almost always showed the most active proliferation so that the lumen became distorted. This was especially well seen in one case (2—1866) where the lumen was obliterated by an infolding of the actively proliferated intima (Fig. 1). In some cases, probably where the process was slow, the lumen was completely occluded by elastic tissue with almost no cells. More often, however, a tendency was manifest for the new tissue to undergo necrosis in a middle zone immediately internal to the old internal elastica. This degenerated zone was transparent and often contained fatty endothelial cells. No doubt it was due to its nourishment being cut off by the tissue around the lumen. As a result of this process an inner tube was often separated off, the space around which in five cases was distended with blood, thus forming a dissecting aneurism (Fig. 2). In two of these cases the space was filled with blood from branches of the artery, but in the others no branches were found in this region, so that it was probable that the degenerated intima was undermined by the central blood stream. The media was not affected until late, when it showed atrophy and ultimately disappeared. Spindle



cells around the lumen sometimes closely resembled a new-formed media.

The changes in the vein were analogous to those in the artery. The primary change was evidently subendothelial cellular proliferation with formation of connective tissue. New elastic tissue was also often formed, but this was always in finer fibrils and less abundant than in the arteries. When the process was evidently active, new cells were abundant and the connective tissue slight in amount; when slow, few cells were present and the new tissue was hyaline or fibrous. When very active, the cells were very small and might have been mistaken for lymphocytes. The new-formed connective tissue was sometimes not easily differentiated from the old adventitia, so that an appearance was produced of a normal vein with a very small lumen. In some cases the vein was almost completely occluded in this way, and the remaining small lumen obliterated by endothelial proliferation. In other cases the vein wall was hyaline, so that the vein somewhat resembled an iris vessel. In most cases the vein wall was unevenly involved and irregular or partly collapsed, in this way the size of the lumen being reduced. In some cases the proliferated intima projected into the lumen in a papillary manner (Fig. 3). Fatty degeneration was not evident, though no doubt suitable fat stains would have shown more or less of it. In four cases a condition not hitherto recognized was noted. This was the encroachment of a bundle of neuroglia upon the wall of the vein. The wall of the vein, perhaps as a result of this, was collapsed and the lumen reduced to a narrow slit. Without the aid of complete serial sections this appearance might well have been mistaken for a large vein filled with actively proliferating endothelial cells.

Just as in the case of the artery, degeneration often occurred around the new intima and the space so formed sometimes filled with blood. Dissecting aneurisms were thus formed in six cases, in five of which the source of the blood was found to be a branch or collateral. In one case there was an inner tube, surrounded by blood, such as just described as occurring in the arteries, the wall of which was necrotic and its lumen closed by endothelial proliferation. Fig. 4 shows a branch entering the space around it. So far as I know, this condition

has not hitherto been described. Another form of dissecting aneurism was produced in an analogous way but presented a different picture, the lumen of the vein being divided into several compartments by septa. This condition has been noted several times by other observers, in cases of hemorrhagic glaucoma, notably by Coats and Harms, who regarded it as due to canalization of a thrombus. In a previous case,<sup>1</sup> by means of a complete series of sections I was able to show that it really was a dissecting aneurism, the septa being due to the undermining of the degenerated intima by the blood from a branch, and the bulging into the lumen of the intima thereby produced. This explanation was fully confirmed by the findings in the present series of cases.

The explanation of why the central retinal vessels should be so markedly affected in secondary glaucoma is not obvious. Three factors at least, however, must come into consideration; namely, the direct action of the increased intraocular pressure on the retinal vascular system, the action on the central vessels of toxic substances resulting from the relative stagnation of the intraocular fluids, and the traction on the vessels produced by the receding lamina cribrosa. The first of these seems to me to be the most important factor of the three. It seems entirely probable that the increased intraocular pressure, by compressing the retinal vessels and thus raising the pressure in the central artery, would cause a so-called compensatory proliferation of its intima. The explanation of the still more frequent changes in the central vein, however, is not so clear, for the pressure in the vein would be diminished instead of increased. Possibly this diminished pressure, especially if associated with collapse of the vein wall, would of itself lead to intimal proliferation. Another possible explanation of the latter is that it is due to the excess of carbon dioxide or lack of oxygen in the vein resulting from the impeded circulation in the retina. Where the artery was also affected this explanation would apply with still greater force.

The almost complete absence of retinal hemorrhages in this series of cases is noteworthy. Thus out of fifteen cases of complete or almost complete obstruction of the central

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<sup>1</sup> "Obstruction of the Central Retinal Vein," ARCHIVES OF OPHTHALMOLOGY, 1907, xxxvi., 32.

vein, in only one case were they present in any number. In two other cases there were a few small hemorrhages, but it was doubtful if they were the result of the obstruction of the central vein. This infrequency of retinal hemorrhages was probably due in some cases to the marked involvement of the artery, and in others to the slowness of the process allowing the establishment of adequate collateral circulation in the nerve. Edema of the retina for similar reasons was not marked in any case.

It is obvious that in chronic primary glaucoma the central vessels must be subjected to the same influences as in secondary glaucoma, and hence must likewise undergo proliferative and degenerative changes. This suggests that the diminution in vision in chronic glaucoma may be largely due to partial obstruction of the central vessels. There can be no doubt that in the absence of other causes complete blindness ultimately would be produced in this way. Nevertheless it is not probable that endovasculitis of the central vessels is a frequent or important factor in the loss of vision in glaucoma. This is indicated by the fact that, with two exceptions, changes in the central vessels sufficient to cause impairment of retinal function occurred in only advanced cases of secondary glaucoma in which there was already atrophy of the optic nerve and retina, and also by the fact that in eight cases, equally far advanced, the central vessels showed only moderate changes. In other words, it is probable, generally speaking, that loss of vision in chronic glaucoma is already practically complete before marked obstruction of the central vessels occurs. It is possible, however, that where a tendency to general angio-sclerosis already existed, chronic glaucoma would produce obstruction of the central vessels more quickly.

The fact, established by these cases, that chronic glaucoma leads ultimately to complete obstruction of the central vessels brings up again the question previously raised by me whether or not many cases reported in the literature as instances of primary obstruction of one or the other central vessel are really such. It is certain that some of them are cases of primary glaucoma, but just which ones it is difficult to determine. This question, which is of some importance from the standpoint of diagnosis and treatment, will be discussed more

fully in a later communication dealing with primary and hemorrhagic glaucoma.

#### CONCLUSIONS

Secondary glaucoma always produces, sooner or later, endovasculitis of the central retinal vessels, leading ultimately to complete obstruction of both. The same variety of changes are seen as in cases of primary obstruction of these vessels. Thrombosis does not occur. Dissecting aneurisms not infrequently occur in both the vein and artery, producing complicated appearances which have been mistaken for canalized thrombi.

Obstruction of the central vein due to secondary glaucoma, probably owing to its slow development, seldom if ever produces the intense hemorrhagic retinitis often seen after primary obstruction of this vessel.

In chronic primary glaucoma, endovasculitis of the central retinal vessels, where not coincidental, is the result, not the cause, of the increased intraocular pressure. In the majority of cases it probably does not reach a sufficiently high degree to impair vision until the latter is already lost from other causes.



## THE OPTIC DISK IN PURULENT OTITIC DISEASE AND ITS COMPLICATIONS.<sup>1</sup>

BY DR. E. GRUENING, NEW YORK.

CHANGES in the appearance of the optic disks occur in purulent middle-ear disease and its complications. In 1871 Clifford Allbutt, now Sir Clifford Allbutt, wrote a book entitled, *On the Use of the Ophthalmoscope in Diseases of the Nervous System, etc.* It is a remarkable book, as modern to-day as it was more than forty years ago. Allbutt's observations and interpretations of the appearance of the optic disk in health and in disease are based chiefly upon the teachings of Albrecht von Graefe. What interests and concerns us particularly, is the concise and exact differentiation of optic neuritis and choked disk. These two distinct pathologic conditions of the optic disks occur in the course of purulent otitic disease and its complications; and their precise differentiation has an important bearing upon diagnosis, prognosis, and therapy of the disease.

In 1879 Charles J. Kipp, of Newark, N. J., and in 1881 Zaufal of Prague urged the use of the ophthalmoscope in all stages of suppurative acute and chronic ear disease. Zaufal considered the examination of the diseased ear incomplete without the ophthalmoscopic finding.

In our present-day otologic literature the condition of the optic disk is but casually referred to, and it seems that its diagnostic significance is more lightly regarded than formerly. At times the statement is made that an optic neuritis has developed into a choked disk, and this implies that choked disk is a more advanced stage of optic neuritis. This is an erroneous view.

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<sup>1</sup> Read before International Otological Congress, Boston, 1912.

Choked disk has an initial, an intermediate, and an advanced stage, every one of which is the ophthalmoscopically visible expression of increased intracranial pressure. The German term "*Stauungspapille*," introduced by Albrecht von Graefe, expresses the various phases of local engorgement more precisely than the English term "choked disk," which applies to the most marked stage alone. It is as easy to diagnosticate the pronounced choked disk as it is difficult to recognize the earliest stage. The true value of such an early recognition, however, lies in the fact that the diseases in which choked disk occurs are amenable to treatment. Optic neuritis in otitic complications, on the other hand, is a frequent concomitant of purulent meningitis, and in that disease our present-day therapeutic measures have hitherto proven futile.

In acute purulent meningitis due to otitic or other causes, the outlines of the optic disk are often blurred, and here there is a true inflammation of the optic nerve and its disk. Though there may be an increase of intracranial pressure due to an excess of cerebro-spinal fluid, there is no choked disk because, early in the course of the disease, the intervaginal space is sealed by exudative material, and the serum does not enter the lymph spaces of the optic nerve and the perilymphatic sheaths of the optic and retinal vessels.

How can the choking of the disks, which lie so far from the area of disease, in purulent middle-ear affections be explained? If we turn to text-books on ophthalmology or otology, we do not find in either a succinct and lucid explanation of this inter-relation. It is a known fact that an increased intracranial pressure due to an excess of cerebro-spinal fluid causes choking of the disks. But what causes the excess of cerebro-spinal fluid? Theodor Leber's theory of chemotaxis may furnish the desired clue. The pyogenic germs in the otitic area have a wide sphere of action, and may, by the diffusion of their toxins, induce a change in the walls of distant vessels, allowing a transudation of the serum of the blood.

What is known as meningismus, serous meningitis, and serous labyrinthitis may be caused by an excess of serum without inflammatory products.

Another point of interest is that the degree of swelling may vary in the two disks. As we assume that the hydrostatic

pressure is equal at all points within the brain there must be local structural conditions causing these variations. The recognition of a higher degree of swelling of one disk determined my plan of action in a case of double mastoiditis with symptoms of thrombosis of the lateral sinus. It was doubtful in this case which of the sinuses was involved. As one optic nerve was more swollen than the other, it was assumed that the sinus was involved on that side. This conclusion was verified by the operation.

Further confirmation that we have not to deal with inflammatory action and destruction of nerve tissue in the choking of the disks in otitic cases is supplied, in my personal experience, by the fact that on removal of the purulent area, be this a purulent mastoiditis, an extradural abscess, a sinus thrombosis, or any other complication from which the patient recovers, the optic nerves finally assume their normal appearance, and show no impairment of function.

As to the genesis of choked disk, I wish to mention especially that Schiek's theory<sup>1</sup> explains best the facts which have come under my observation.

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<sup>1</sup> "Beiträge zur Kenntniss der Genese der Stauungspapille," Franz Schiek, *Arch. für Ophthalmologie*, Band 78, Heft 1.

## THE RODS AS COLOR-PERCEPTIVE ORGANS.

BY DR. V. O. SIVEN, DOZENT IN PHYSIOLOGY, HELSINGFORS, FINLAND.

Translated by Dr. ALFRED BRAUN, New York.

At present the view is prevalent, that the chromatic apparatus of the retina is represented by the cones, and that the rods are color-blind organs, whose function is to intermediate the impressions of weak light-intensities—that is, that they constitute a dark-chamber apparatus.

This theory was first propounded by Max Schultze. Schultze supported his theory upon a series of comparative anatomical studies. Nocturnal animals, such as bats, moles, owls, etc., have scarcely any cones, whereas the rods are exceptionally well developed. For this reason, Schultze thought that the rods constituted an apparatus for seeing in the dark, and as colors do not exist in the dusk, these organs are color-blind. Furthermore, since the color-sense of the human retina is most markedly developed in the centre, and diminishes toward the periphery, and the cones are so arranged, that they are most numerous in the centre, Schultze came to the conclusion that the chromatic apparatus of the eye was formed by the cones.

This theory was then further developed by Parinaud and especially by von Kries and his school, and is at present accepted by most observers.

Some experiments in color physiology, performed by von Wendt and myself, eight years ago, caused us to doubt the truth of the present teaching of the total color-blindness of the rods. I tried then, in several papers, to show that the rods intermediate color-sensations, of short wave-lengths—*i. e.*, violet and blue. As some experiments were recently



published, whose results seem to support this theory, I thought it would be of some interest to set forth the reasons, here, against the von Kries duplicity theory, and in favor of the view that the rods are also chromatic organs.

The most important support of the theory of the complete color-blindness of the rods is, according to von Kries, the appearance of the dim spectrum. As this monochromatic spectrum is colorless, and as von Kries and his school have shown by exhaustive studies that it is the rods which receive the light-impressions from this spectrum, von Kries concluded that these organs intermediate only colorless impressions. Such a conclusion seems, *a priori*, somewhat hasty, especially so if the so-called lack of color of the dim spectrum is examined closely. This statement is not correct, as the dim spectrum has a beautiful bluish tone, as can be very easily demonstrated. Von Kries himself mentions this fact, although only in passing. "In reality," he writes, "there are certain facts, which tend to show that rod-sensations are not really colorless, but somewhat bluish." Yet von Kries has completely neglected this fact, namely that this spectrum is not really colorless, in order to favor his duplicity theory, which demands a complete color-blindness of the rods.

As the theory of the complete color-blindness of the rods depends largely on a series of examinations of the dim spectrum, it seems to me that the fact that this spectrum is really colored, is of considerable importance in deciding the entire question. In support of the duplicity theory, there has been brought forth the fact of so-called complete color-blindness (monochromasia). The characteristic thing in persons who present this anomaly is, that they cannot distinguish between the different colors in the spectrum. The entire spectrum seems to them to consist of a single color. In other words, they are monochromates. What is particularly interesting, is that the division of light in the spectrum is the same for these people as for a normal eye adapted for darkness. From this fact, the conclusion was drawn, that these so-called completely color-blind people see only with the rods, and have assumed that they see no colors whatever, but that everything appears gray.

The logic of this conclusion is, however, by no means bind-

ing. For, even though these people see the spectrum as one color, it does not follow that the impression given by this simple spectrum is that of complete absence of color. On the contrary, it is very probable that these so-called "rod-seers" see the spectrum in the same bluish tone as a normal eye adapted for darkness. The term total color-blindness is therefore not very apt, and should be changed to monochromasia. This anomaly cannot be considered as a support for the theory of the complete color-blindness of the rods.

Max Schultze brought forward, as an argument in favor of this theory that the cones constitute the chromatic apparatus, the fact that the color-sense is most marked in the centre of the retina, and diminishes toward the periphery, which conforms to the arrangement of the cones in the retina. However, Schultze's view in regard to the distribution of the color-sense is only partly correct. It is true only for light of long wave-lengths. The perception of light of short wave-lengths is just the opposite.

In connection with this, some of the circumstances in connection with the color-fields should be touched upon. On account of their varying extent, we are entitled to assume that the color-perceiving apparatuses for red and green lie more in the centre of the retina, while the apparatuses which perceive blue and yellow lie more in the periphery. If we persist in the assumption that the cones only constitute the chromatic apparatus, it is very difficult to explain this variation in the extent of the color-fields. This can be explained only by assuming that color-perception is distributed among various cones, so that one cone perceives only one color (red, green, or violet), or two colors (red-green or yellow-blue). In Oehrvall's laboratory in Upsala, Oerum studied this question, and came to the conclusion that each fundamental color was perceived by a different cone.

Therefore, the red and green perceiving cones are most numerous in the centre, while the violet perceiving cones occur also in the periphery. However neither Oerum's investigations nor the Young-Helmholtz theory give any explanation of the fact, that the field for yellow extends far beyond the limits of the red and green fields. For, since yellow, which, according to the Young-Helmholtz theory, occurs as the result of

the combined action of the red and green perceiving apparatuses the color field for yellow must coincide with that for red and green.

I have tried to test the foundation upon which the Schultze-v. Kries teaching rests, and there is no denying the fact that the foundation is a very weak one. In addition, there are many observations in color physiology which do not agree with this duplicity theory. The most important of these is the fact of the varying sensitiveness of the retina for light of varying wave-lengths, in such a manner that the centre is more readily excitable for light of long wave-lengths than for light of short wave-lengths, while the periphery acts in just the opposite way.

This fact is very well illustrated by the well-known Purkinje's phenomenon. This consists in the fact that the color-perception of light of long wave-lengths disappears before that of short wave-lengths, when the intensity of the light is diminished, and the adaptation of the eye is changed. When, for instance, a red and a blue paper appear to have the same light intensity by daylight, with the onset of dusk, the blue appears lighter, and the red darker. As it becomes darker, the red disappears before the blue, and for this reason, as v. Helmholtz says, on a dark night, when no other colors are seen, the blue of the sky can still be distinguished.

This phenomenon has received especial attention from all experimenters, and has been explained in various ways.

Helmholtz was of the opinion that it depended upon objective differences in the light intensity; that the phenomenon was a purely physical one. On the other hand, Hering showed by ingenious experiments that it depended upon the adaptation of the eye. He tried to explain this in harmony with his theory of the specific light-strength of the colors. This theory teaches that each color possesses two valencies, one colored and one colorless, and furthermore, that in light of long wave-lengths, the colorless valency is less than in light of short wave-lengths. Purkinje's phenomenon rests, according to Hering, upon the so-called "receptive capacity" of the two colors. In darkness, the colored valencies disappear, while the colorless persist. As in light of short wave-length (blue) the white valency is stronger than

in light of long wave-length (red), it is easily seen why, in the darkness, the blue color appears lighter than the red.

This is not the place to attempt a criticism of this explanation. Only one point must be brought out, which shows the error of Hering's view, and is, at the same time, of considerable importance for the teaching of the color-blindness of the rods. Hering claims (and according to his theory of valencies he must do so) that the color-perception of red disappears at the same time as that for blue. However, this is not the case. Helmholtz says that the red color disappears earlier, and that when the perception for all other colors has gone, the perception for blue still remains. That this is really so, any one can easily convince himself. For the physiological explanation of Purkinje's phenomenon, the fact that it does not occur in the fovea, is of considerable importance. This fact was first observed by Parinaud, and denied by Koster, Tschermak, Hess, and others, and finally proven to be true by v. Kries and Nagel. I have also found that Purkinje's phenomenon is not present in the portion of the retina which contains no rods. Von Kries ascribes the absence of the phenomenon in the fovea to the absence of the rods here.

By proper observance of Purkinje's phenomenon, it can be determined that when the fovea centralis (or in other words the cones) no longer reacts to light of short wave-lengths, the periphery of the retina still perceives such light, and that here there is a distinct sensation of color. This important circumstance has been too little noted. However it proves that this color perception can be intermediated only by the rods.

Purkinje's phenomenon demonstrates in an instructive way the color-perceptive powers of the rods. In support of this theory, I might also mention v. Wendt's and my studies of yellow vision in santonin poisoning. After taking a certain dose of santonin, all white objects appear a light yellowish-green, in daylight. Shadows and dark objects appear reddish violet. If the eye of a person poisoned by santonin looks at a spectrum, the violet color is absent. The eye is, in other words, violet-blind. This is the cause of the yellow vision. All white objects must appear in the color which occurs when the violet color disappears—that is, in its complementary color, yellowish-green.



On closer examination of this so-called yellow vision, one observes that it occurs only in the periphery of the retina. Central vision remains white. A perimetric examination of v. Wendt's and my own santonin poisoned eyes showed that in an area of 8-10° about the fixation point, there was no yellow vision. This fact speaks in favor of the view that santonin affects in some way the formation of visual purple in the retina. This view is supported by Filehnes' investigations, which demonstrated that in santonin-poisoned frogs there were proven to be disturbances in the formation of visual purple.

Consequently we must look for the seat of the violet-blindness in santonin poisoning, in a disturbance of the normal function of the rods, from which we deduce the fact that under normal conditions these organs cannot be color-blind.

A similar yellow vision occurs in icterus. This color-phenomenon was investigated by E. Rose, Hirschberg, and myself. Hirschberg was of the opinion, that it depended upon a yellow coloring of the media of the eye. For various reasons, this cannot be so, and we must, in agreement with E. Rose, look for the disturbance in the retina itself. As I was in the position to observe, the yellow vision during icterus is also limited to the periphery of the retina, while the purple-free region sees white. While this speaks against a simple yellow coloring of the media, it proves at the same time that the seat of the disturbance is in the rods. As we know that the biliary salts are the only material which can dissolve the visual purple from the rods, we are led to the belief that this disturbance is caused in some way by the biliary salts which circulate in the blood of the icteric patient.

Furthermore, in patients with hepatic disease, hemeralopia is not uncommon, a fact which would point to disturbances of the liver function as factors in influencing the rods of the retina.

Hemeralopia itself may also be used as a support for the theory of the color-perception of the rods. It is a well-known fact that hemeralopia is usually accompanied by blue-blindness (violet-blindness?). If hemeralopia depends upon a disturbance of the rods, it is very likely that the disturbances of color-vision which accompany hemeralopia are also caused by the rods.

In 1904, Lundsgaard claimed, as a result of his observations of red vision in hemeralopia, that the visual purple and the rods are concerned either directly or indirectly in the perception of blue.

It is characteristic for hemeralopes, that Purkinje's phenomenon does not occur among them. This speaks for my explanation of this physiological occurrence, and also for the correctness of the assumption that the rods have color-perception.

In regard to the latest investigations, I would like to discuss Hess's interesting researches on the color-perception of day- and night-birds, as these investigations support my theory.

Hess's investigations show the error of Parinaud's teaching of the rôle of the visual purple in hemeralopia. In support of his theory, Parinaud has stated the fact that animals who have no visual purple, for instance the day-birds (chickens, pigeons), are hemeralopes, whereas the nocturnal birds, which have considerable visual purple in the retina, see very well after dusk.

I do not wish to dwell on the investigations of seeing in the dark, but merely want to touch on the results which Hess's work brought out in regard to the color-perception of these birds. They show that day-birds, which have no visual purple, have a very much shortened spectrum in the short-waved portion.

The violet, blue, and bluish-green rays do not appear to be able to excite the retina of these animals. On the other hand, the nocturnal birds, with their profusion of visual purple, see the short-waved portion of the spectrum almost as well as the human eye.

Yet Hess does not connect this fact with the difference in the occurrence of visual purple in these animals, plainly because he looks upon the cones, *a priori*, as the sole chromatic organs. He looks for the cause of this difference in the yellow-colored oil-globules which occur in the inner portions of the cones of these birds. These oil-globules are supposed to absorb the short-waved light, which is thus prevented from reaching the outer portion of the cones. If this were the explanation, we would expect that the yellow-colored oil-droplets are not present in nocturnal birds, as these perceive the short-waved light.

However, this is not the case, as these birds also possess these globules. But, says Hess, in these animals the globules are less intensely colored, hence the difference.

It is likely that the real explanation of the above-mentioned fact is to be found in the unequal presence of visual purple in the day and nocturnal birds. Thus Hess's investigations also support the theory of the color-perception of short-waved light by the rods.

With this view Köllner's newest investigations on the relationship between adaptation for darkness and violet-blindness can be brought into harmony. I wish only to touch upon that here.

I have tried to discuss here the most important facts in color physiology, which disprove the theory of the color-blindness of the rods. Some time ago, Ebbinghaus and Koenig combated the view that the visual purple constituted the violet or blue-perceiving substance, according to Helmholtz's color-theory. As I had the honor to show, so many of the newer observations speak against v. Kries's duplicity theory that, in my opinion, it can no longer be upheld. On the other hand, all of the facts hitherto known, in the study of color, can be brought into harmony with the theory that the rods are the organs which are concerned in the perception of color of short wave-lengths.

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## ON THE ETIOLOGY OF PARINAUD'S CONJUNCTIVITIS.

BY DR. KRUSIUS AND DR. CLAUSEN, BERLIN.

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(With two figures on Text-Plate XIII. of the German Edition)

**A**FTER the communication of Wessely, before the meeting of the German Ophthalmological Society, in Heidelberg, in 1910, the question of the possible tuberculous origin of Parinaud's conjunctivitis has aroused fresh interest. Wessely reported on a butcher boy who suffered from a clinically typical Parinaud's conjunctivitis. Implantation of the diseased glandular structure took in monkeys, and the histological and biological examination of these monkeys showed a tuberculous lesion, probably of a bovine type. These observations were confirmed by the clinical experience of Schreiber, Brückner, Wagenmann, and Siegrist.

Several months ago we had the opportunity of observing two cases of Parinaud's conjunctivitis. Before our observations were completed, Stuelp reported on a case of Parinaud's conjunctivitis, and brought strong proof of its tuberculous nature.

CASE I.—H. S., 12 years old, of healthy parentage; two brothers are healthy. The boy has had measles—has been otherwise well. Ten days ago the patient suffered from fever, and the right eye became inflamed. The mother noticed a red tumor in the region of the lid, and brought the boy to the hospital. The child has never associated with cattle, though he has played with a cat. The boy is healthy; there are some enlarged glands. The preauricular gland in front of the right ear is enlarged, but not sensitive. Physical examination reveals nothing abnormal, except possibly the percussion note over both apices is somewhat

diminished; breathing is somewhat diminished over this area, on the left side; on the right side expiration is somewhat prolonged.

On examining the right eye there is moderate blepharospasm, and the conjunctiva is injected. On everting the right lower lid, there is a large hypertrophic swelling which is situated between the eyeball and the lid. The swelling is covered by a number of yellowish-white nodules. The eye is otherwise normal. Wassermann test negative; von Pirquet negative. On *Feb. 10th*, 1 milligram (0.001) of old tuberculin was given subcutaneously.

*February 12th*, evening temperature,  $38.2^{\circ}$ , no local reaction.

*February 13th*, normal temperature.

A second subcutaneous injection of the same amount of old tuberculin was given, followed by a rise of temperature up to  $38^{\circ}$  on the following day, but without any local reaction.

*February 18th*, no fever. A second von Pirquet test made, strongly positive.

On *February 18th*, one drop of  $\frac{1}{100,000}$  old tuberculin is instilled in both conjunctivæ without producing any local reaction during the next day.

On *February 20th*, a drop of  $\frac{1}{10,000}$  solution is instilled without causing any local reaction in the next thirty-six hours.

On *February 22d*, a  $\frac{1}{1000}$  old tuberculin instillation is made, which also produced no local reaction.

On *February 27th*, a piece of the hypertrophic conjunctiva is excised. A part is implanted into the anterior chamber of a guinea-pig. The rest is sent to Koch's Institute for diagnosis.

On *March 8th*, the patient is discharged cured. Two weeks later the glandular swelling is very much diminished; the conjunctiva is normal.

The implantation in the guinea-pig showed the following: This guinea-pig, after an intracutaneous injection of 0.02 old tuberculin, showed a completely negative intracutaneous reaction.

On *February 27th*, the tissues removed from the patient were put into the anterior chambers of both eyes.

On *March 2d*, there was a corneal opacity and a small prolapse of iris.

On *March 14th*, the animal received another intracutaneous injection of 0.2 old tuberculin. On the following day the site of the intracutaneous injection was strongly positive. It was red, swollen with necrosis on the following days; the controlled animal was negative.

On *April 12th*, the animal died without typical tuberculosis having developed in the eyes. The particles were found surrounded by a fibrous exudate, and there was a plastic iritis. The anatomical examination of the guinea-pig showed no evidences of tuberculosis.

CASE II.— M. S., of healthy parentage, and with no particular previous illness, has had trouble off and on with phlyctenular kerato-conjunctivitis. At present the eye condition has been somewhat worse for two weeks, the glands on the left side have enlarged, and there has been some fever. The child is poorly nourished, rather pale, the cervical glands on both sides are enlarged, and there is a glandular swelling in front of the left ear.

In addition to the evidences of a phlyctenular conjunctivitis, the left eye presents the following condition: The conjunctiva is very red. Between the lower lid and the eyeball there is a hypertrophic swelling about 2cm broad, situated on the transition fold. On the swelling there are a number of isolated yellowish-white nodules. The Wassermann test is negative, von Pirquet's strongly positive. The treatment consisted in boric acid and silver nitrate.

*January 30th* 1 milligram of old tuberculin was injected subcutaneously, without producing any rise of temperature or local reaction. This was repeated on February 3d, with negative effect.

On *February 13th*, a third injection of the same amount was given. The temperature rose to 38.5°; there was no local reaction.

*February 18th*, one drop of old tuberculin,  $\frac{1}{100,000}$ , was instilled in the conjunctiva, without any effect.

On *February 20th*, a drop of  $\frac{1}{10,000}$  solution of old tuberculin was instilled, and there was no local reaction during the next thirty-six hours.

On *February 23d* a  $\frac{1}{1000}$  solution of old tuberculin was dropped in the eye, also without any effect.

*February 27th*, a piece of the hypertrophic tissue was excised, some of it was introduced into the anterior chamber of a rabbit, and the rest was sent to the Koch Institute for diagnosis.

On *April 5th*, the child was discharged cured, except for some opacities from the phlyctenular keratitis. The preauricular glands are still enlarged.

The transplantation was made on *February 27th* to a guinea-pig, which did not react after an intracutaneous tuberculin test, thus proving the animal to be free from tuberculosis. On *March 2d*, the animal died. The particles

of tissue implanted in the eyeballs seemed to be free from reaction. The general autopsy showed nothing.

On *May 12th* the pre-auricular swelling had almost disappeared.

The examination of the tissues, which had been sent to the Institute for Infectious Diseases, showed a negative result in the first case; in other words, no tuberculosis developed, while in the second case, a very weak tuberculosis resulted.

These two cases, with their febrile onset, pre-auricular glandular swelling, one-sidedness, the association with animals, together with the clinical picture of the conjunctiva, unquestionably confirm the diagnosis of Parinaud's conjunctivitis. We did not undertake any histological examination, as we wished to use all material available for inoculation. The many histological examinations which have been made have not revealed any characteristics of a tuberculous structure, though the animal experimentation has been positive. The inoculation experiments have shown in both cases that virulent tubercle bacilli must have been present in the excised tissue, though they were unquestionably very few. In Case I. tubercle bacilli could not be found, though after the implantation of the material into the anterior chamber of the guinea-pig, the previously negative intracutaneous tuberculin reaction became strongly positive. This according to the experimental studies of one of us is very important in the estimation of the infection with virulent tubercle bacilli. Of interest in these two cases are, furthermore, the results of the biologic tuberculin diagnosis, because these are, in a certain respect, opposed to the inoculation symptoms. In both cases the cutaneous reaction of von Pirquet was positive. In both the subcutaneous tuberculin test was positive. This shows in both cases that the body at some time or other had been infected with tuberculosis. This result, of course, does not prove anything as regards the process in the eye, because here alone a local reaction is necessary. In both cases, notwithstanding the general reaction, every vestige of a focal reaction at the site of the conjunctival lesion was absent. The repeated conjunctival instillation of tuberculin in ascending doses also gave no evidences of a local reaction. We must believe that the biologic reaction does not prove the tuberculous nature of the conjunctival lesion.



The inoculation showed the presence of a few tubercle bacilli in the tissue.

The principal result of the experimental tuberculin investigations seem to point to a tendency to form a relative immunity after a tuberculous primary infection against a tuberculous reinfection. The idea of a conjunctival tuberculous reinfection of an organism which had already been infected with tuberculosis is proven by the positive cutaneous and general reactions and the symptoms of the clinical picture, stormy onset, arrest in the first glandular swelling, spontaneous recovery. The cutaneous and subcutaneous tests have shown that a tuberculous infection and a consecutive specific adaptation of the body had taken place. The conjunctival lesion could not be the primary seat of this specific adaptation, because in the presence of a general reaction all local signs were absent. If the conjunctival disease is to be regarded as a tuberculous one, it can only be explained as a local tuberculous reinfection in a body which had previously become tuberculous. This interpretation of a reinfection receives a further proof by the associated phlyctenular process, which we do not regard as an accidental association.

From the present clinical and experimental view on the genesis of the human phlyctenule, it can be taken for granted that it is not itself tuberculous, but it is a local reaction to various specific injuries to the eye in a body which has been previously infected by tuberculosis.

## A CASE OF EVERSION OF THE PIGMENT LAYER OF THE IRIS.

BY DR. R. HACK, WÜRZBURG.

Translated from *Arch. f. Augenhlk.*, Vol. LXVIII., 1910.

(With two colored illustrations on Text-Plate X. of the German Edition.)

FRANKE, in 1886, drew attention to the radiating fissures of the pupillary portion of the iris after contusion of the eyeball. This publication was followed by the report of a number of similar observations. They give, in general, a survey on the number and the depth of these tears, their complications in reference to injuries to deeper structures of the eye, and the mechanics of the injury. Though these tears seem to be comparatively frequent, isolated ruptures of the pigment layer of the iris, following injuries of the eye, are unusual.

Gelpke was the first to draw attention to the traumatic coloboma of the pigment epithelium of the iris. He observed in a perforating injury of the eye by a sharp piece of iron, in addition to other injuries, a 2mm broad fissure which extended in a radiating direction to the ciliary insertion of the iris, that is behind the iris, leaving the pupillary margin intact. Boerma has also described two cases after perforating injury. In one case the fissure extended from the pupillary margin to the root of the iris, its parallel edges were about  $\frac{1}{2}$ mm apart. In the second case there were two fissures of varying intensity, in the pigment layer, which could be recognized by illuminating the lens, which was situated posterior to them. By concentration of the light in the focal illumination, no red reflex could be obtained through the pigment coloboma on account of the associated traumatic cataract.

I should like to report on a case which is worthy of interest

on account of its great rarity and for which I have been able to find only one similar condition described in literature

A farmer, 21 years of age, came to our clinic for glasses. On inspection a black thread was found to project free into the anterior chamber out of the pupil of the left eye; and this moved with movements of the eye. The eye was completely free of any irritation, and the tension was normal. In the outer and lower quadrant there was a very small, delicate, horizontal scar, to which the iris was adherent at its pupillary margin. The pupil was consequently distorted and drawn towards this scar. The synechia was discolored on account of the deposit of curious brownish-black pigment. The iris was tremulous in its outer half. The pupil promptly dilated with atropin. From the pupil a long, brownish-black thread hung out of the pupil down to the bottom of the anterior chamber on the anterior surface of the iris. On examining this structure with the magnifying glass, it seemed to be made up of a conglomeration of branching varicose tortuosities, which accompanied every movement of the eye, and seemed to project distinctly from the posterior surface of the iris. Somewhat external from this place a small mass of pigment projected into the pupillary region. The lens presented a few opacities, and in the part near the adhesion there were some vitreous opacities, and the eye was myopic. The right eye was normal, and was also myopic. That this condition could only be the result of a perforating injury, seemed perfectly clear.

The father remembers that fifteen years ago the son was injured in the left eye, and some fluid was said to have escaped from the eye. The eye remained red for some time, and later he noticed this black thread in the eye. This hanging thread in the pupil could only belong to the pigment layer of the iris. The correctness of this was easily demonstrated by the use of the Sachs lamp. The pupil immediately became red, and almost the entire outer and lower quadrant of the iris, though the red light which shone through this quadrant of the iris was somewhat obscured.

The mechanics of this injury can be explained as follows: The blade of straw probably perforated the cornea, and struck the iris near its pupillary margin, perforated this, and reached up to the pigment layer. This layer was thereby separated from its underlying structure, and on account of its unelasticity, the posterior layer of the iris was torn; the pigment strip, being fixed at the pupillary margin, was then everted

through the pupil by the escaping aqueous. The perforating injury then healed, with the production of an anterior synechia.

Gelpke assumes that in his case the traumatic pigment coloboma was the result of an oblique perforation of the cornea by the piece of iron between the pupillary margin and the anterior lens capsule which mechanically removed the pigment layer of the iris.

Boerma believes that the inelastic pigment layer ruptures on account of the pressure exerted by the displaced lens. This pressure the anterior layer of the iris easily follows.

The only analogous case which I have been able to find in literature is a short account by Praun. In a woman the only result of a contusion of the eyeball by a piece of wood was the eversion of the torn-off piece of the pigment layer of the iris through the pupil. This folded flap looked like a carpet hung out of a window.

No mention is made of the transillumination of this part of the iris.

I would like to mention that Vüllers, in 1907, drew attention to the absence of the retinal pigment layer of the iris after inflammatory processes in the uveal tract, and recommends Sachs's lamp for their demonstration, as well as in cases of injury of the posterior layer of the iris.



REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE NEW YORK  
ACADEMY OF MEDICINE.

By DR. MARTIN COHEN, SECRETARY.

MEETING HELD OCTOBER 21, 1912.

Dr. RUDOLF DENIG presented a patient with an **ammonia burn of the eye**. As in the two other cases of lime-burn presented to the Section in the spring of 1912, he performed a circular excision of the burned conjunctiva around the limbus on the fifth day after the accident, and covered the defect by a large circular lip flap. Within three weeks after the operation the cornea cleared up nearly entirely.

Dr. H. H. TYSON inquired whether the cornea was involved, to which Dr. Denig replied that it was not. Dr. Tyson then related a case of severe burn of the conjunctivæ, corneæ, pharynx, tissues of the eyelids and face. It occurred when a patient in epileptic coma unexpectedly moved his hands, dashing the ammonia held before him to inhale, into his eyes and nares, so that it trickled into his pharynx. On the second day after the accident, when called in for consultation, he found a dense keratitis striata and iritis, and both corneæ very hazy. The eyes had been previously bathed with boric acid solution. Vision O. D. and O. S. was barely movements of hands. Atropin in olive oil was instilled and a 1 per cent. boric acid ointment used freely at first, weak iodoform ointment later. After about six weeks the eyes were healed and vision was O. D.  $\frac{20}{50}$ , O. S.  $\frac{20}{50}$  with correction.

Dr. TALBOT R. CHAMBERS reported a case of **regeneration of corneæ lost in ophthalmia neonatorum**. A boy, one day old, had sore eyes. The Credé method had been employed.

Gonococci were found in child and both parents. The child appeared healthy and strong otherwise.

Argyrol instilled and the eyes were left undisturbed for fifteen minutes. A boric solution was allowed to flow between the lids, night and day. Ice compresses. In spite of atropin, pupils became pin-point. Four days later: Ice and atropin discontinued. Six days later: Anterior wall of both eyes almost melted away. No anterior chamber. Four days later: Right iris prolapsed. Next day: Corneæ growing from the periphery. Four days later: Right cornea complete and transparent, but left had a large central macula. Anterior chambers about half normal depth. Child died later from effect of hot weather.

Dr. Chambers also presented this statement in substantiation:

"This certifies that the Demato child when one day old, on May 29, 1912, became a patient in Christ Hospital, Jersey City.

"That on June 8th or thereabout, the cornea of each eye had melted away and there was no anterior chamber and the iris was the anterior wall of each eye. There was no pupil or rather it was pin-point in each eye: that on June 12th, the cornea began to grow from the periphery in each eye.

"ANTHONY G. SACCO, M.D.

"HAROLD W. BROWN, M.D.

"M. E. BAXTER, M.D."

The child was seen by the doctors in an Italian Dispensary in New York City and they recommended some operation to restore sight—about June 15th.

Dr. JULIUS WOLFF had had a similar case with an infected corneal ulcer, causing a prolapse of the iris of about  $\frac{1}{4}$  inch. Conjunctiva chemotic. After application of wet dressings and compression, the mass became gradually smaller, finally resulting in thin, transparent, corneal tissue.

Dr. J. H. CLAIBORNE remarked that Dr. Peter Callan had reported a similar case several years ago.

Dr. C. W. CUTLER thought that the cornea could not very well become transparent after such complete destruction of the corneal tissue.

Dr. OTTO SCHIRMER said the tissue could not become trans-

parent in regeneration of the cornea, as Bowman's membrane was never restored, and that the scar tissue would cause permanent opacity in later years.

Dr. W. B. WEIDLER reported a case of **large papilloma of the cornea** with microscopical demonstration of growth. Patient was a fisherman, aged 61. Family history negative as to malignant growths; personal history negative. Had noticed three years ago a redness over the left eyeball at the interpalpebral space, which six months later had assumed the present dimensions: 12mm long, 8 wide, and 8 high. Freely movable, dense and firm to touch. Uneven and very vascular surface. The epithelial layer of the cornea seemed to be invaded. The growth was neither painful, nor tender, did not bleed freely and appeared to be limited to the cornea. The tumor was said to have grown rapidly. No glandular enlargements about ear or neck. Vision O. D.  $\frac{5}{8}$ , O. S.  $\frac{5}{9}$ . A month later the eye was reported to be getting white and to give no trouble whatever.

*Microscopical Examination.*—The outer two-thirds of the tumor showed a very large papilla-form arrangement. It is invaded throughout by a formation of new blood-vessels which do not show the typical walls. Several hemorrhagic areas are present in sections. Collections of very small round cells are seen in different sections, one near the center being larger than the others. Between the cells there are some septa of connective tissue. There are neither giant cells nor cell nests. This portion of the growth suggests the possibility of a carcinomatous change taking place in or near the center. The epithelial layer of cells in the small dissected strip are much hypertrophied and thickened by connective tissue stroma of low development.

Dr. EDWARD A. DAVIS had a similar case, in which fibroma was demonstrated by microscopical examination. There had been no recurrence after several years' observation.

Dr. WALTER E. LAMBERT presented a patient who had a large and ragged **foreign body in the vitreous** removed by a scleral incision and the aid of a small magnet. The foreign body was located by Dr. Dixon in the lower and outer quadrant. The vitreous was cloudy. Lens clear. There was a subconjunctival hemorrhage. Recognizing the danger of

detachment of retina as pointed out by Prof. Haab, he considered it might be disastrous to the eye to remove the foreign body by the usual method, being so very large and ragged. Vision to-day, after a month, is  $\frac{2}{7}$  without any retinal detachment; and the result up to-date appears to be excellent, although the future will tell its effect.

Dr. OTTO SCHIRMER said he preferred removing foreign bodies in vitreous through the anterior chamber. If large, he used at first mild power, and then, if necessary, applied the magnet for varying periods of time for several days.

Dr. CLAIBORNE said the interest in the case, although excellent at present, would lie in the future.

Dr. W. B. MARPLE presented a patient with **retro-orbital tumor**, whose sight had been gradually impaired for the past two years, exophthalmos appearing recently. Counted fingers at two feet. Ophthalmoscopic examination indicated optic neuritis. There was no ocular palsy. The tumor is probably of slow growth.

Dr. CLAIBORNE asked if there was any accessory sinus involved. Dr. Krug said that a rhinological examination would be performed shortly.

Dr. EAGLETON said he had had a patient with a mucocoele of the ethmoid which had given no pain; there was distinct exophthalmos.

Dr. H. H. TYSON presented a case of **ptosis following a Heisrath operation for trachoma**. A. B., 21, applied at the Vanderbilt Clinic for the relief of ptosis. She had been previously operated upon for trachoma, a portion of the conjunctiva having been excised. Immediately after the operation the upper lid drooped, a condition which had never existed before.

Several such cases had been noticed in Germany, but none had been presented at the Section. The present case did not detract from the merits of the operation itself, but showed a possible result of it when performed with imperfect technique.

Dr. CLAIBORNE thought that the section of the retrotarsal fold in this case was too far back, and that he had not encountered such a result in any similar operation performed either by himself or others.



Dr. EAGLETON reported a case of **congenital tumor of sclera and cornea**.

Dr. W. B. WEIDLER thought it looked like a lipoma and advised microscopical examination of a piece of the tumor.

Dr. W. B. WEIDLER presented a 3-year-old, well nourished healthy girl with a **double optic atrophy**, primary, probably due to syphilis. Mother had one miscarriage and died of tuberculosis. Patient had measles and whooping cough. Mind bright and clear. Eighteen months ago she fell on her head, and there is an indefinite story of convulsions. About a year later vision failed and has remained so.

Pupils: 5mm. No reaction to light, accommodation, or divergence. Media clear. Scleral ring is pale white with some atrophy of choroid. Vessels are small and contracted. General atrophic changes in fundus. Slight lateral nystagmus. Urine negative, Wassermann positive, knee jerks absent, station and gait normal. Von Pirquet negative. X-ray of skull failed to show any abnormality. The history of miscarriage, positive Wassermann, absence of knee jerks and of secondary symptoms in the fundus, as seen after meningitis, made the above diagnosis tenable.

Dr. W. M. LESZYNSKY considered the history faulty and thought that the spinal fluid should be examined to rule out syphilis. The condition might be due to pressure in the inter-peduncular space.

Dr. W. B. MARPLE presented a set of Dr. Ballantyne's **aseptic dropping tubes**.

Dr. TALBOT R. CHAMBERS described a new **lamp for retinoscopy**.

Light, which is satisfactory for ear, nose, and throat is too bright for eye work. The author has devised a three-armed bracket to suit all cases without the escape of light except through the intended opening. It consists of a 40 Watt electric bulb, a brass cylinder to hold it, with an opening outside of which is a raised groove for insertion of a smoked lens. This will allow the pupil to dilate. With the lens removed, the observed pupil will at once contract.

Dr. MARK J. SCHOENBERG read a paper on **Clinical and experimental researches on intraocular pressure**. (Published in full in this issue.)

Dr. TYSON, having known the purport of Dr. Schoenberg's paper for some two weeks, had made a few tests, from the result of which he could confirm Dr. Schoenberg's findings. He hoped the author would be able to formulate a uniform rule as to the rate of decrease in tension with more extended observation and investigation, which would be of great value as an aid in diagnosis in doubtful and prodromal glaucomas. The rate of return of increased tension was also an important point to establish, and he thought Dr. Schoenberg would find a similar disparity. — The facts brought out in this paper were worthy of investigation.

Dr. SCHIRMER hoped the work, although new, would at some future date be utilized to good advantage, and thought it would still require more work to prove certain principles.

Dr. CUTLER asked what anæsthetic was used; whether the tonometer could be used on closed eyes; whether the cornea was damaged, and whether the application of the tonometer did not inhibit the secretion of the intraocular fluid, thereby affecting the tension.

Dr. SCHOENBERG, in closing the discussion, stated that the anæsthetic used was holocain; that the application of the tonometer did not damage the cornea; that using the instrument on closed lids was not accurate, as this affected the tension of the eyeball. As to the instrument inhibiting the intraocular fluid, he could not answer at present.

MEETING HELD NOVEMBER 18, 1912.

Dr. H. H. TYSON presented a case of **lipodermoid** in a negro girl, aged 15. The tumor was noticed at birth and had gradually increased in size. It was yellowish in color and was located at the outer circumference of the left eyeball, overlying the external rectus. It consisted of two large lobules, the larger being below, and both extending deep into the orbit behind the outer canthus. The conjunctiva covering it appeared greatly thickened like skin, and had a greasy reflex with several hairs growing upon it. On account of the irritation produced by the hair, and for cosmetic reasons, it was advised that the tumor be removed.

Dr. GRUENING said that these tumors do not increase in size.

Dr. TYSON replied that he had only seen the case recently,

and he accepted the statements of the mother. These agree with the experience of Fuchs, that these tumors sometimes increase considerably in size around puberty, and he thought that in this case the mother's observation and statement were correct.

Dr. WEEKS presented two patients with the condition known as **family nodular keratitis**; one the father, a man of 56 years, the other a son of 23 years. The peculiarity of each was a punctate or short-lined, elevated opacification on the cornea, gradually lessening in density toward the periphery, terminating about 2mm from the margin of the cornea. The condition was the same in both patients except that it was more pronounced in the elder. The vision of the father was  $\frac{20}{70}$ , of the son  $\frac{20}{40}$ . The affection had been noticed in early youth in both, and had very slowly advanced. There had been no inflammation and no pain. The father had had three brothers and five sisters. He reports that two of the sisters and one brother had poor vision, but he did not know the nature of the trouble. Besides the son here presented, there were two others; one, aged 18 years, had been examined and the eyes found to be normal, the other son was reported to have poor vision, but as he was in another city the nature of the trouble could not be determined. Dr. Weeks spoke of the appearance and pathology of this affection as follows: The opacification begins from the twelfth to the eighteenth year and slowly increases in density. Males and females are affected in about the same proportion. The opacity is greatest at the center of the cornea, never reaching the limbus. The development is extremely slow, beginning as minute dots or lines. "Examination at an early stage shows that the opacity is made up of little light gray streaks and dots, which by transmitted light appear transparent like threads of glass and little drops of water on a glass plate." Fehr is of the opinion that the changes are due to the development of hyaline masses in the superficial lamellæ of the cornea, in which the crystals of phosphate of sodium urate are subsequently deposited.

Dr. OATMAN said that these cases belong to a class which appears in certain families. It is most frequently called "gitterige keratitis" from a tendency of the lesion to form

superficial grill-like opacities on the cornea. It also assumes the form of lines, dots, etc., and then is named according to the shape of the opacities.

Dr. H. W. WOOTTON presented a patient, male, 45, with **bilateral proptosis** which was first noticed about eight months ago. It was now very marked, the orbital fat being dislocated and readily visible on slightly elevating the lids. The latter can, however, be closed. No history of injury, no goitre, no tachycardia, no psychic symptoms. There are fibrillar tremor and motor limitation of the globes. Fundi normal. Vision for form normal, for colors contracted. Accessory sinuses exceedingly large, but apparently clear. Wassermann negative. Treatment with urotopin, resulting in some improvement. The diagnosis rests upon the proptosis and tremor, together with the fact that no other cause can be assigned for the exophthalmus.

Dr. JOHN GUTTMAN presented a case of **polyp of the conjunctiva**.

Dr. KELLNER presented and demonstrated the use of the following instruments: (1) Large ophthalmoscope after Gullstrand; (2) Hertel's exophthalmometer; (3) binocular magnifier; (4) monocular and binocular telemagnifier.

Dr. ARNOLD KNAPP read a paper entitled **Retinal changes in adolescence**, which appeared in full in last issue of these ARCHIVES.

Dr. OATMAN stated that, according to Michel, recurring intravitreal hemorrhage of young adults is often the first symptom of tuberculosis of the uvea. Axenfeld asserts that there may be tuberculous disease of the intraocular vessels without visible fundus lesions. He had seen a case of recurring intravitreal bleeding which recovered under tuberculin injections.

Dr. WEEKS said that the opinion that retinal hemorrhage and the subsequent development of some cases of retinitis proliferans in adolescence was due to tuberculosis was relatively new and was gaining ground. The opinion that bacterial infection of other forms was responsible for retinal hemorrhage in some cases and that local endarteritis was responsible in some others was believed by some observers. That the development of connective-tissue bands in the vitreous must



be preceded by the occurrence of a clot in the vitreous with or without the presence of red blood corpuscles is conceded by nearly all observers. It is also known that not all the formations of clots in the vitreous are followed by the formation of connective tissue bands. It would, therefore, follow that a condition favorable to the development of new connective tissue must exist. What determines this favorable condition is not known, but that the development of connective tissue bands constituting the condition known as "retinitis proliferans" may follow "idiopathic" hemorrhage, hemorrhage due to traumatism, and hemorrhage in syphilitic retinitis and chorio-retinitis is well known. In cases of "idiopathic" retinal hemorrhage and retinitis proliferans the possible tuberculous nature should be kept in mind and, if this can be substantiated, treatment with tuberculin should be instituted.

Dr. MARPLE has had a similar case with vitreous hemorrhage in a young person. While the treatment and prognosis were unsatisfactory, still he thought a suggestion was given in this paper as to its origin.

Dr. REESE recalled a case with a tumor-like mass of the choroid which gave a positive general tuberculin reaction; however, the therapeutic tuberculin treatment arrested the process.

Dr. ROBERT G. REESE presented a paper on **Dystrophia epithelialis corneæ**, stating that the majority of cases are due to local disturbances of nutrition, many of which have, prior to the appearance of Fuchs's monograph in 1910, been erroneously diagnosed as glaucoma. It is a bilateral affection of advanced age, chiefly affecting the female sex; exceptionally, the right eye alone is attacked. The onset is insidious without any manifestations of irritation, both corneæ becoming insensitive. There are variations in vision unattended by variations in pressure, vision being worse in the morning, contrary to glaucoma. According to Fuchs, the changes are characterized by a grayish opacity, roughening of the corneal surface caused by small vacuoles in the epithelial cells, and newly formed tissue between Bowman's membrane and the epithelium, consisting of homogeneous connective tissue without any signs of hyaline or mucous degeneration. Larger vesicles are due to the separation of the epithelium

from Bowman's membrane which occurs later in the disease. The anæsthesia of the cornea is due to the injury of the superficial nerve fibers of the epithelium, the subepithelial nerve plexus, or the fibers connecting the two. The explanation of the pathogenesis is therefore probably a disturbance of nutrition affecting first the nerve and then the cornea, which is supported by the fact that paralysis of the trigeminus is followed by keratitis neuroparalytica.

Glaucoma, which complicates a number of cases, may result from the dystrophia, or there may be an etiological factor common to both. The etiological factor, known so far, is advanced age. Occupation plays no part, and nearly all the patients were in good health and showed no signs of malnutrition.

The affection should be differentiated from opacities caused by noxious vapors. In these cases, however, the lesion is confined to the palpebral aperture and disappears when the noxious agent is withdrawn. Acute keratitis vasculosa occurs in neurotic subjects or together with herpes; in the chronic form it usually complicates some grave eye lesion. Postoperative sclerosis of the cornea in the aged resembles dystrophia, but is probably due to traumatism of the endothelium.

Dr. KNAPP hoped that Dr. Reese would have something new to suggest in the line of treatment in this condition. In his experience, the cases of dystrophy had occurred after a cataract operation in senile patients. He thought at one time that a section entirely in the cornea might have something to do in bringing on this condition; but in one of the two cases observed the section was a scleral one with a conjunctival flap. The process in these cases seemed to be a lack of regenerative power of the corneal nerves, which had been divided at time of operation. There is one important feature in this connection, and that is, if one eye develops this condition after a cataract operation, no operation should be done on the other eye.

Dr. WEEKS. The term dystrophy, meaning changed or ill nutrition, may manifest itself in many ways. In the epithelium of the cornea it may be an atrophic change due to senility, to disease of the Gasserian ganglion, or due to trau-

matism. When due to senility it may appear in the form of ribbon or band-shaped keratitis, or it may affect the entire cornea. When due to disease of the Gasserian ganglion, it will affect the cornea corresponding with the ganglion affected and will usually involve the entire cornea. When due to traumatism, it usually affects the entire cornea. In all cases the corneal surface is roughened. The cornea may exfoliate. There is loss of sensibility. Dr. Weeks had observed a number of cases. Treatment did not appear to be of much avail.

Dr. W. B. MARPLE gave a brief report of the Oxford Ophthalmological Congress of this year. As to Professor Straub's (Amsterdam) paper on the doctrine of scrofulosis, he did not think that the lecturer had presented any very good reasons for continuing the word "scrofulosis." The discussion on coal miners' nystagmus brought out the almost unanimous opinion that this was due to the defective illumination from the Davy safety lamp. In mines where unprotected lamps were permitted, nystagmus was almost unknown. Van Lint's (Brussels) sliding flap operation in the removal of cataract claims to diminish the liability to infection and prolapse. But as this is a rare complication to-day, Dr. Marple did not feel inclined to use it.

A pleasant feature of the program was that there were only a few papers, with an interval between them, which gave the hearers an opportunity to look over the exhibits and to investigate new preparations and devices. Among the exhibits there were a collection of beautiful colored drawings of 250 mammalian and reptilian eyes, by A. W. Head, Maddox's useful device for locating the axis in patients' glasses, and Thomson's beautiful macroscopic preparations of the eye.

Dr. Marple concluded by stating that Oxford was at present a splendid place to study anatomy under Professor Thomson and his assistants.

Dr. KNAPP thought that the great advantage of the Oxford meetings was that the meetings were held in university buildings with laboratories, so that every facility was given for the proper demonstration of specimens, methods of examination, and apparatus. The lack of this is especially felt in the summer hotels, where most of our meetings are held.

REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE ROYAL  
SOCIETY OF MEDICINE.

By MR. C. DEVEREUX MARSHALL, LONDON.

THE PHYSIOLOGY OF THE INTRAOCULAR PRESSURE.

At a meeting of this Section on Wednesday, December 4th, under the Presidency of Sir ANDERSON CRITCHETT, C.V.O., the subject for discussion was **The physiology of the intra-ocular pressure.**

Dr. LEONARD HILL, F.R.S., in opening the debate, said the reason Dr. Flack and he appeared before the Society was because some researches which they had been carrying out on the relation of the general circulation to secretion led them to investigate the eye. The subject had already been brought before the Royal Society, but there were some new points which he would speak on. For the purpose of measuring the intraocular pressure, Mr. Thomson Henderson and he made some experiments because with the ordinary hypodermic needle they could not avoid leakage in the track of the needle. The result was, they devised a needle which did not permit of leakage. They found, by very carefully checked experiments, that the aqueous pressure varied within fairly wide limits, depending on the blood pressure: the higher the arterial pressure, the higher was the aqueous pressure. In one case, under chloroform, it was 16mm of mercury, and under ether narcosis, when the animal was in good condition, going up as high as 62mm. By a compensation method they obtained readings which seemed to agree, so there seemed but little chance of error. It was very important that the pressure of the aqueous should be positive, because that kept the eyeball as a perfect optical instrument. Its distension, in their



opinion, was maintained by secretory pressure. Though the pressure varied anywhere between 10 and 50mm according to the condition of the circulation, the eyeball retained its shape. The pressure in the capillaries and the pressure of the aqueous must always be the same. In a previous investigation they found that the pressure of the cerebro-spinal fluid and the pressure of blood in the cerebral veins were the same, and the two varied together. Various workers had made investigations and it was found by viewing the retinal vessels with the ophthalmoscope that the flow ceased in them when the pressure reached that of the general arterial blood. Dr. Hill and his colleague punctured the cornea of a cat, and then on gently pressing the abdomen the iris on the same side immediately burst into hemorrhage: all the capillaries allowed the blood to escape, and that came off every time. The explanation was that the normal aqueous pressure was exactly counterbalancing the capillary pressure. The aqueous had a definite chemical nature, and its osmotic pressure was said to be higher than that of the serum. Ehrlich demonstrated, by the injection of fluorescene, that some kind of circulation was proceeding in the aqueous. It seemed, from careful inquiry, that the cribriform ligament was opened up, and thus a passage was made for the fluid into the supra-choroidal space. That transference of fluid would allow accommodation to take place. The suspensory ligament was always taut, exerting elastic traction on the lens and causing it to assume its proper shape. The intraocular tension was said to be due to the elasticity of the lens, but it had no elasticity, for when removed it was a soft, pudding-like body. In the act of accommodation the muscle contracted, but continued to be of the same volume as the uncontracted muscle; on contraction it really moved inwards, as described by Thomson Henderson, and allowed the fluid to pass from in front of the lens either into the spaces of the ciliary body, or into the space of the cribriform ligament and into the supra-choroidal space.

Professor Starling, F.R.S., said most would agree with the facts which Dr. Leonard Hill had advanced, but he was not in close agreement with some of the interpretations which the opener placed upon them. It was important to have some idea of the factors determining the formation and

absorption of the intraocular fluid, but more important to know what those factors were. It seemed to be generally agreed that the seat of production of the intraocular fluid was the ciliary processes, and the chief absorption was at the anterior angle of the eye, and some probably occurred at the root of the iris.

Covering the ciliary processes was a well-marked epithelium, containing columnar or cubical cells, which might well be endowed with the property of secretion, as they were as well formed as those of the salivary gland, or of the kidney tubules. What were the conditions which must be observed if the intraocular fluid was to be regarded as a filtration? The intraocular fluid was at considerable pressure, so there must be resistance against its flow from the eyeball. But if the pressure there was in consequence of the pressure of the blood in the vessels, the pressure of the intraocular fluid must go up with the rise of pressure in the vessels. When the carotid or subclavian artery was obstructed, cutting off the blood supply from the eyeball, the pressure came down; and it went up again in proportion to the amount of blood one allowed to enter those vessels. One could take 25mm as the average intraocular pressure. Stimulation of the sympathetic nerve caused a double effect: first, contraction of the unstriated muscle fibers of the orbit and a rise of pressure, and as the vessels of the ciliary process contracted so as to diminish the blood pressure in those vessels, there was a fall also in the intraocular pressure. There was a quick rise due to contraction of the nictitating membrane and the unstriated muscle fibers, and a rise of pressure. As the formation of intraocular fluid passed off, there was a fall of pressure, accompanied by constriction of the vessels of the eyeball. He contended that the blood pressure must be higher in the vessels all the way along than outside and than the intraocular pressure, and the quicker the rate of flow through the system of vessels concerned, the greater must that difference of pressure be. There was no reason for saying it was impossible for a difference of pressure to exist between the capillaries and the fluid outside; but there was every reason for assuming there must be a difference. One could not know how much fluid came out until one ascertained what was the rate of transudation. If the pressure

remained constant, that rate was the rate of absorption. Professor Starling showed a number of slides to illustrate his point. It was impossible to measure the pressure in the capillaries, under normal conditions. By increasing the pressure of the intraocular fluid one brought up the pressure in the capillaries towards that in the arteries. At some future time it might conceivably be shown that the cells coming from the ciliary processes might act as regulators, but at present there was no evidence that they acted otherwise than as guiding and strengthening the filtering membrane. In regard to the relationship of the capillary to the venous pressure, he had never been able to understand Dr. Leonard Hill's position on that point. Into the mechanism of accommodation he did not propose now to enter, except to say he supposed it to be due to a shifting of fluid between the posterior chamber and the anterior chamber, which could easily take place, as there was no resistance between the fibers and the suspensory ligament.

Mr. PRIESTLEY SMITH (Birmingham) said it was important to know what was the normal pressure in the human eye. It certainly varied in different people and in the same person at different times; but what would be a fair average? A pressure of 60mm, which had been mentioned, would surely mean that the person had glaucoma. Dr. Hill had said that the intraocular pressure was equal to the venous pressure, and to the pressure in the capillaries. He, Mr. Smith, thought it was equal to the venous pressure at one point, *i. e.*, where the blood left the eye, but that at every other point the intraocular pressure was lower than the blood pressure. Dr. Hill had not shown that the pressure in the torcular herophili was equal to the pressure in the veins and the other parts of the skull; and, as Professor Starling said, there could not be equality of pressure or there would be no movement. But the difference in pressure was probably only very slight. He did not see how Dr. Hill could hold it as proved that the pressure in the capillaries of the ciliary body was the same as the pressure of the intraocular fluid; and every probability seemed to be against that view. It was generally acknowledged that the intraocular pressure was produced by the ciliary processes and he believed the ciliary body also played a part.

There was no question that the vitreous fluid was renewed, but did it come from the posterior surface of the process, or from the *pars plana*? He expressed his objection to the use by some, even chemists, of the term "tension" instead of "pressure." There had been a controversy as to whether the tension of the eye depended on increased volume, or on increased pressure of the blood. Such a discussion was futile, because it depended on both.

(The discussion was postponed until the next meeting of the Section.)



QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

By H. KÖLLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUTLER, Dresden; and VISSER, Amsterdam.

SECOND QUARTER, 1912.

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE. Reviewed by WESSELY.

(Books, Monographs, Historical Essays.)

136. LOHMANN. **Functional disturbances of vision.** Leipsic, 1912.

137. WAGENMANN. **Injuries of the eye.** *Graefe-Saemisch's Handbook of Ophthalmology*, parts 219 and 220.

LOHMANN (136, **Functional disturbances of vision**) deals with physiological optics chiefly from the point of view of the changes that appear as pathological symptoms. The main part of the work is contained in the chapter on the pathology of entoptics, disturbances of the light sense, adaptation, color sense, and binocular vision. The section on color hearing should be specially mentioned. The book is a very good guide to the literature on the subject, which is freely quoted.

In these parts of Graefe-Saemisch's Handbook WAGENMANN (137, **Injuries of the eye**) deals with burns, both by high temperatures and by alkalies and acids, with special attention to those produced by lime. Then he passes to injuries by other chemical agents, vegetable and animal poisons, and finally electricity.

KÖLLNER.

## II.—RELATIONS OF OPHTHALMIC TO GENERAL DISEASES, INCLUDING POISONS. Reviewed by WESSELY.

138. ANTONELLI. Polyneuritis of the cranial nerves after treatment with arsenobenzol. *Société française d'ophtalmol.*, May, 1912.
139. BITTORF. Disturbances of the internal secretions. *Berl. klin. Wochenschrift*, No. 28, p. 1072.
140. COPPEZ, H. Ocular complications of Paget's disease. *Journal médical de Bruxelles*, June 13, 1912.
141. COUTELA. Ocular accidents attributed to arsenobenzol. *Archives d'ophtalmologie*, xxxi., p. 1.
142. ELSCHNIG. Indicanuria and diseases of the eye. *Wien. klin. Wochenschrift*, No. 19.
143. ELSCHNIG. Conclusion of the discussion concerning indicanuria and diseases of the eye. *Ibid.*, No. 24.
144. FEHR. The effect of salvarsan on the eye. *Centralbl. f. pract. Augenheilkunde*, June.
145. FEHR. The outbreak of syphilis in the eye after treatment with salvarsan. *Med. Klinik*, No. 23, p. 942.
146. FOERSTER. Differential diagnosis and treatment of methyl-alcohol poisoning. *Muench. med. Wochenschrift*, No. 16, p. 862.
147. FUCHS, E. Tabes and the eye. *Wien. klin. Wochens.*, No. 14.
148. GUTMANN. Diseases of the contents of the orbits after extraction of teeth. *Berl. ophth. Gesellschaft*, Feb. 29, 1912.
149. LEBER, A. Tropical diseases of the eye. *Meeting of the Ophthalm. Society of Heidelberg*.
150. MOISSONIER. Optic neuritis of gouty origin. *Société française d'ophtalmologie*, May, 1912.
151. PICK, L., and BIELSCHOWSKY. Histological conditions in the human eye and central nervous system in acute, fatal poisoning with methyl alcohol. *Berl. klin. Wochenschrift*, No. 19, p. 888.
152. REDSLOB. Schools and eyes. *Strassburger med. Zeitung*, No. 3.
153. REICHARDT. Studies of the brain. Part 2, Jena, 1912.
154. SATTLER, C. H. Pathological examination of a case of blindness after injections of arsacetin. *Arch. f. Ophth.*, 81, 3, p. 546.
155. TERSON. Ocular lesions in polymorphous erythema; erythema nodosum and tuberculosis; erythema nodosum and glaucoma. *Arch. d'ophtalmologie*, xxxii., p. 274.
156. TERSON, A. The dental origin of certain affections of the eye. *Journal médical de Bruxelles*, April 4, 1912.
157. WIEGMANN. A case of disease of the optic nerve after whooping cough. *Klin. Monatsbl. f. Augenheilkunde*, April, p. 460.

According to A. LEBER (149, Tropical diseases of the eye) the study of the as yet little known diseases of the eye peculiar to the tropics presupposes a knowledge of the general climatological factors which govern the biological relations of the organism in those countries. To these must be added

the racial biological conditions, which render difficult the nosological comparison of tropical and non-tropical diseases. Exudative inflammations of infectious or toxic origin stand in the foreground among the diseases of the lids. Bacterial are less common than mycotic infections. Framboesia, leprosy, and gangosa cause extensive changes in the lids. In diseases of the conjunctiva the power of regeneration is striking. Forms of conjunctivitis induced by fungi and allied organisms render the clinical pictures to be observed very numerous. Inflammatory intraocular symptoms are met with in dengue, hemorrhages in malaria and anchylostomiasis, and serious degenerations of the choroid caused by emboli in filariasis. Nervous disturbances of central origin have been met with in beriberi and an endemic encephalitis has been observed in Samoa. The stamping out of epidemics of tropical diseases of the eye must be begun by the adoption of hygienic measures.

KR.

REDSLOB (152, **Schools and eyes**) examined in three years about 4000 eyes of school children and found diseases of the lids and conjunctiva in 10% of the cases, of the cornea in 13%, of the lens, retina, optic nerve, uvea, and vitreous together in only about 3%, nystagmus in 1%, strabismus in 7%, and errors of refraction in 68%. The last were hypermetropia in 17%, myopia in 14%, and astigmatism in 37%. The great importance of astigmatism is brought out strongly. Mixed astigmatism was present in only 2% of all cases of astigmatism. He then deals with the prescription of glasses, the surveillance over the children, their choice of occupations, instruction in writing, and the formation of special classes for children with poor eyes which has been undertaken in Strassburg.

GUTMANN (148, **Diseases of the contents of the orbits after extraction of teeth**) has seen three cases of serious orbital trouble following extraction of teeth by dentists who apparently were not sufficiently aseptic. In one case, a child, aseptic thrombosis and bilateral cellulitis of the orbit were caused; in another cellulitis of one orbit with sinus thrombosis; in the third an empyema of the antrum of Highmore which led to a neuritic atrophy of the optic nerve.

According to TERSON (156, **The dental origin of certain affections of the eye**), diseases of the teeth play an important part in the etiology of diseases of the eye. Blepharospasm, abscess of the lid, pareses of the muscles, and hypersecretion of the lachrymal gland are induced in this way; more rarely, inflammation of the iris and ulcers of the cornea. Optic neuritis with or without sinusitis may result from a periodontitis. Inflammation of the maxillary sinus may cause detachment of the retina and retinal hemorrhages; extraction of teeth may give rise to infectious metastases in the choroid. Visual disturbances, varying in degree from a weakness of the accommodation to bilateral amaurosis, may originate in affections of the teeth, and even glaucoma may be excited or made worse by them. Etiological connection is also shown to exist between infections in the orbit, pareses and contractions of the muscles of the eye, and extractions of teeth or inflammations in the vicinity of the teeth.

DANIS.

BITTORF (139, **Disturbances of internal secretions**) reports first a case which presented the symptoms of acromegaly, as well as a dilatation of the sella turcica in the X-ray picture, but who had instead of a bitemporal, a binasal hemianopsia with pale papillæ. As Wassermann's reaction was positive, and as improvement followed the administration of potassic iodide, the trouble is supposed to have been a syphilitic process at the base of the brain in the neighborhood of the hypophysis, which involved the non-decussating fibers of the optic nerve. He also reports a case of dystrophia adiposo-genitalis in which the X-ray picture showed a great enlargement of the sella turcica and a choked disk was found on ophthalmoscopic examination.

WIEGMANN (157, **Disease of the optic nerve after whooping cough**) found in a woman 40 years old, who had had an attack of whooping cough and complained of obscuration of vision, a haziness of the margins of the papilla and venous engorgement. He ascribes the condition found to the long duration of the whooping cough with its often repeated conditions of engorgement of the vessels of the head.

COPPEZ (140, **Ocular complications of Paget's disease**) has found in four cases of Paget's disease little yellowish



patches of degeneration in and about the macula, which caused metamorphopsia and little scotomata. They develop slowly and sometimes are accompanied by punctate hemorrhages. These places blend and finally form an atrophic spot. The optic nerve remained healthy. An incipient cataract was present in each case.

DANIS.

MOISSONIER (150, **Optic neuritis of gouty origin**) observed a typical retrobulbar neuritis in a gouty person 43 years old. Such cases are rarely met with. The visual disturbance consisted of the characteristic pains behind the eye and a central scotoma, while the external and internal condition of the eye appeared to be normal. A cure was attained within twenty-five days by treatment with aspirin and colchicum, bleeding, and subconjunctival injections. Moissonier is inclined to think that retrobulbar neuritis is more commonly of gouty origin than has hitherto been supposed.

CAUSÉ.

The papular, macular, and nodular forms of polymorphous erythema frequently cause diseases of the eye. TERSON (155, **Ocular lesions in polymorphous erythema**) reviews these with special reference to their connection with tuberculosis and with glaucoma. He reports two cases of erythema affecting the eye in tuberculous patients, one macular, the other nodular. He thinks that the nodular form occurs the more frequently with tuberculosis. Glaucoma is excited in erythema by a hypersecretion. The local treatment of the ocular symptoms is usually unsatisfactory; the best results are obtained by dionin. The main treatment must be directed toward the etiological disease.

CAUSÉ.

FUCHS (147, **Tabes and the eye**) says that the assumption that reflex immobility of the pupils is characteristic of tabes, and that absolute immobility is on the contrary diagnostic of cerebral syphilis, is not absolutely correct, because in reality both sorts of pupillary disturbance are met with in both diseases. Tabetic ptosis not rarely exhibits the peculiarity that it increases in abduction of the eye and decreases in adduction, to such a degree indeed that the lid may rise higher than that of the other eye, a phenomenon that is to

be ascribed to an abnormal transmission of the stimulation from the nucleus of the internus to that of the levator in the diseased nuclear region of the oculomotorius. The division of tabetic optic atrophy into two types, one with a uniform loss of central and peripheral vision, the other with sector shaped defects in the visual field with good central vision, is not justified, for the two forms blend with each other. There are only three special types: 1, a minimal central visual field with good vision, exceptionally with preserved color sense, as in glaucoma; 2, a papillomacular scotoma, as in toxic amblyopia, a form observed in 30 of his private cases of tabes, which always led to total blindness in spite of all antisypilitic treatment, so that a complicating retrobulbar syphilitic neuritis was excluded; and 3, bitemporal hemianopsia, which cannot be an accidental simulation by the loss of this part of the visual field because homonymous or binasal hemianopsia never is produced in the same way, but for which no satisfactory explanation can be given.

REICHARDT (153, **Studies of the brain**) claims that the cause of the reflex immobility of the pupil is not a disturbance in the reflex arch between the sensory and motor roots of the nerve, but is in diseases of the upper portion of the cervical spinal cord and about the fourth ventricle. Disturbances of the pupillary reaction can also originate in the cortex of the cerebrum. He distinguishes a tabetic, spinal "neurologic," and a paralytic, cerebral "psychiatric," reflex immobility of the pupil. The prognosis as to life may be said to be favorable when it is associated with meiosis, unfavorable when the pupils are moderately or widely dilated.

ELSCHNIG (143, **Indicanuria and diseases of the eye**) maintains that the demonstration of an abundance of indican in the urine is at the present time the best known symptom of the pathological breaking down of albumin in the organism, and that it should be taken into account in the etiology of certain diseases of the eye. He has found an increased quantity of indican in 40% of the cases of iridocyclitis in which no other disease could be detected in the organism to serve as its cause.

PICK and BIELSCHOWSKY (151, **Poisoning with methyl alcohol**) made histological examinations of the eyes and

central nervous systems of three patients who died of methyl alcohol poisoning. An extensive chromatolysis and breaking down of the fibrillary substance was found in the ganglion cells, uniformly distributed over all parts of the retina, in all of the cases. In addition there was in places, especially about the vessels, fatty degeneration of the optic fibers, yet these changes were unimportant in comparison with those in the ganglion cells. These injuries must be considered as primarily due to the poison, as the time was too short for the production of secondary degenerations. Signs of degeneration were also found in the ganglion cells of the central nervous system, but they were far behind those in the retina, both quantitatively and qualitatively.

For the treatment of methyl alcohol poisoning FOERSTER (146, **Diagnosis and treatment of methyl alcohol poisoning**) recommends stimulation of diuresis and diaphoresis by the administration of large quantities of fluid, sweat baths, lively movements (not rest in bed), and forced respiration in well ventilated rooms, when the patients are seen before the outbreak of the grave symptoms, as these measures accelerate the excretion of methyl alcohol, the same as they do that of ethyl alcohol.

FEHR (145, **Effect of salvarsan on the eye**) found that 217 out of 2636 patients examined before treatment with salvarsan had syphilitic conditions in the eye,  $8\frac{1}{4}\%$ . The large number, 41, in which the condition was incidentally discovered, such as cases of advancing optic neuritis without visual disturbance, is striking. After the treatment with salvarsan 451 patients were seen again, and in 32 of these diseases of the eye had appeared in the meantime. Of these 12 had iritis, 3 chorioretinitis, 11 optic neuritis, and 6 pareses of the ocular muscles. It is difficult to compare the percentage of syphilitic eye affections after salvarsan with the percentage before the use of the drug, but Fehr thinks there is no material difference between them. He does not believe that the outbreak of these affections is to be blamed upon the salvarsan.

COUTELA (141, **Ocular accidents attributed to arsenoben-zol**) gives a condensed account of the eye symptoms observed in the use of salvarsan. He considers it beyond all doubt that those which appear in the uveal tract after injections of

salvarsan are to be ascribed to the syphilis and not to the remedy. The same is true of optic neuritis. The objection that has been raised, that the papillitis comes on earlier than it is apt to do in syphilis, is untenable, as it is commonly observed between the first and the fifth month after infection. Besides, the clinical picture of the neuritis is not that of a toxic, but of an infectious condition. He quotes statistics to show that the frequency of inflammations of the optic nerve has not been increased since the introduction of salvarsan, as has been claimed, but that it remains the same. The same arguments are made to serve with regard to oculomotor changes.

CAUSÉ.

ANTONELLI (138, **Polyneuritis of the cranial nerves after treatment with salvarsan**) saw the onset of a left-sided facial paresis, a right-sided paresis of the abducens, and a bilateral papillitis of moderate degree, after a second injection of salvarsan twenty days after the first. The first injection was made two months after the primary infection. In addition to the above-mentioned troubles, the patient had paralysis of the right auditory nerve, and, some weeks later, paresis of the right oculomotorius. The symptoms passed away, leaving a paralytic strabismus and impaired vision with a slight optic atrophy. The cause was evidently a subacute meningitis. Antonelli believes that outbreaks of this nature are much more frequent after the use of salvarsan than after the classical treatment with mercury, and thinks it should therefore be used only in selected cases and with care.

CAUSÉ.

SATTLER (154, **Pathological Examination of a Case of Blindness after Injections of Arsacetin**) reports the case of a patient with pernicious anæmia who received intramuscular injections of arsacetin in the course of a month, the total amount of the drug used being nearly 5 grams. About six weeks after the first injection the vision failed and the papilla became pale, without the production of a central scotoma. During the next six weeks absolute amaurosis developed together with a genuine optic atrophy. A month later the patient died. The pathological examination revealed a chromatolysis and vacuolization of the ganglion cells of the



retina, atrophy of the nerve fibres, destruction of the medullary sheaths, and proliferation of the glia in the optic nerve, with less signs of degeneration in the optic tract. The papillomacular bundle was less affected than the rest of the nerve. The poison seems to attack particularly the peripheral segment of the third neuron.

### III.—GENERAL AND EXPERIMENTAL PATHOLOGY AND TREATMENT. Reviewed by LOEHLEIN.

158. CONTINO. Electric introduction of ocular anæsthesia. *La Clinica Oculistica*, Jan., 1912, p. 825.

159. FRIEDBERG. Discussion of Roemer's paper on anaphylaxis by means of lens albumin. *Berl. ophthalm. Gesellschaft*, June 13, 1912.

160. GEBB. Therapy of diplobacillus infection of the eye.

161. IGRSHEIMER. Experimental researches concerning syphilis in the eye. *Ophthalmic Society of Heidelberg*, 1912.

162. ISSEKUTZ, B. V. The synergism of local anæsthetics. *Pflueger's Archives*, vol. cxlv., p. 448.

163. KRUSIUS, F. F. Discussion of Roemer's paper on anaphylaxis by means of lens albumin. *Ophthalmic Society of Berlin*, June 13, 1912.

164. KUFFLER. Vitreous immunity. *Ophthalmic Society of Heidelberg*, 1912.

165. ROEMER, P. Anaphylaxis by means of lens albumin. *Ophthalmic Society of Berlin*, June 13, 1912.

166. ROLLET and AURAND. Experimental researches concerning the ocular infections caused by the gonococcus. *Revue gén. d'ophthalm.*, 31, p. 97.

167. ZADE. Antibodies of the cornea. *Arch. f. Ophth.*, 82, 2.

KUFFLER (164, Vitreous immunity) sought to determine with how small a quantity of germs saprophytic infection could be produced in the vitreous. With some, *e. g.* the vibrio Dunbar and the vibrio Metschnikoff, he was able to excite a serious purulent inflammation in the vitreous with from 200 to 1000 germs, but various other kinds of fungi in these numbers excited only very slight signs of inflammation or none at all. He then gives a number of experiments in which the transition of immune substances from the circulation into the vitreous was studied in actively immunized animals, which showed that complement-fixing substances were not demonstrable in the vitreous. Agglutinine and hæmolysine were occasionally found in the vitreous when the

index of the blood serum was higher than 1:10,000, and also when the index of the vitreous was not above 1:10.

KR.

The essential results of ZADE'S (167, **Antibodies of the cornea**) researches are: The normal cornea of a non-immunized rabbit contains opsonine to staphylococci and avirulent pneumococci, yet to a much less degree than the blood serum. It plays no prominent part in the overcoming of corneal infections. The opsonine increases when the eye is irritated. The complement contained in the cornea of the pig is very slight. Foreign serum passes into the normal cornea of a rabbit properly prepared beforehand not less than  $2\frac{1}{2}$  hours after the introduction. A much greater effect follows an intravenous injection than a subcutaneous. Foreign serum enters more quickly and freely when the eye is irritated than when it is in a normal condition. Precipitine, agglutinine, hæmolysine, antitoxine, and perhaps bacteriolysine were demonstrable in the normal cornea when the rabbits had been previously prepared, especially when the eye was irritated by a puncture of the anterior chamber. He finds that the passage of antibodies into the cornea is considerably better than into the normal aqueous.

ROEMER (165, **Anaphylaxis by means of lens albumin**) says that it makes a great difference whether guinea-pigs are treated beforehand and reinjected with heterologous, or homologous lens albumin. When they have been treated beforehand with heterologous lens albumin, the reinjection, whether it be intravenous, or intraperitoneal, is followed by the typical fall of temperature that is characteristic of anaphylactic shock. But if the guinea-pigs are treated first with guinea-pig lens albumin the reinjection is not followed by this fall of temperature. Hence the theory that the lens albumin is to be considered an albumin to a certain degree foreign to the organism is not correct. The biological law applies to the lens albumin, that the organism, in the absorption of albumin from its own body, or from animals of the same species, controls the regulative devices which restrain the development of auto-anaphylactic bodies. The possibility is granted that this difference in the reaction of guinea-pigs to the use of heterologous and homologous lenses may be

only quantitative, for he has found in earlier researches that the formation of anaphylactic antibodies could be perceived in certain animals when the guinea-pigs were first treated with guinea-pig serum. In order then to be able to demonstrate the formation of lens albumin antibodies, which may perhaps be formed in guinea-pigs after previous treatment with homologous lens albumin, Roemer and Gebb instituted a new series of experiments to determine whether the formation of these auto-anaphylactic antibodies can be detected by febrile movements on reinjection of such prepared animals with small quantities of antigen. These have shown that the conditions must be somewhat different with lens albumin than with serum albumin, for the amount of stimulus required to induce febrile movements is relatively high, so that minute doses of lens albumin produce no effect on the previously treated animals. Hence it is not now possible to recognize with certainty the formation of auto-anaphylactic lens albumin antibodies by means of minute doses of lens albumin.

KÖLLNER.

On the other hand, KRUSIUS (163, **Discussion of Roemer's paper**) is of the opinion that there is an anaphylaxis produced in guinea-pigs by homologous lens albumin. As regards the increase of temperature referred to, this can also be produced by injections of salt solution and therefore forms no proof of the onset of anaphylaxis. In his opinion Roemer presents not an essential, but only a relative difference, for the reason that sufficiently fine methods are not as yet known by which to prove the onset of anaphylaxis.

KÖLLNER.

FRIEDBERG (159, **Discussion of Roemer's paper**) objected to the interpretation Krusius had given to the anaphylactic febrile reaction. The supposed action of physiological salt solution, in which the albumin is suspended, to excite an increase of the temperature plays no disturbing part, for in such fever experiments the same volume of salt solution is always injected, and yet the temperature is influenced very differently, caused to rise or fall, according to the quantity of albumin contained in the solution. As regards Roemer's experiments concerning lenticular anaphylaxis in particular he considers them absolutely conclusive.

KÖLLNER.

IGERSHEIMER (161, **Experimental researches concerning syphilis in the eye**) reports the results of injections of mixed and pure cultures of spirochætæ into the blood current. Most of the injections were made into the carotid in order that as much material as possible should enter the eye. The primary symptoms produced are distinguished from those that appeared after a certain period of latency. The commonest primary symptoms were injection of the conjunctiva and of the ciliary vessels, together with white spots in the fundus. These white spots were due in the quite fresh stage to an acute chorioiditis and changes in the outer layers of the retina; in the later stage only the changes in the retina could be found. This condition gives a clear picture of the origin of the peripheral chorio-retinitis of congenital syphilis. As later consequences there were found several weeks after the injection: 1. A hard, superficial, ulcerated tumor of the lid containing spirochætæ, but no other bacteria, and pathologically presenting masses of leucocytes, thromboses of blood corpuscles, and infiltration of the vessel walls. 2. Tumor in the upper lid and in the plica semilunaris after an injection with a pure culture. Histologically: Masses of leucocytes, partly grouped, no changes in the vessels, no other bacteria. 3. Severe parenchymatous disease of the cornea with superficial ulceration. Total absence of the ganglion retinae. 4. Typical parenchymatous keratitis after injection with a pure culture. This proves that there is such a thing as a primary parenchymatous keratitis. 5. Iritis, just beginning, with an exudate very poor in cells in the pupil. 6. Iritis together with spots in the inner layers of the retina. 7. Typical papules of the iris eight days after the injection of a pure culture. 8. Inflammation of the entire uvea, retina, and papilla. 9. Optic atrophy. Great changes in the retina; a focus of softening in the chiasm. 10. Temporal optic atrophy, pathologically the same as in tabes. 11. Optic atrophy at its very commencement after injection of a pure culture. Atrophy of the ganglion cells of the retina. No inflammation. The value of these researches lies in the possibility of finding pathologically nearly or quite identical changes in the early stage of syphilis in the human eye and of tracing their origin.

KR.



ROLLET and AURAND (166, **Ocular infections by the gonococcus**) used rabbits for their experiments and found that contrary to the statement of Christmas, that the gonococci do not find suitable conditions for life in rabbits because of the higher bodily temperature ( $39^{\circ}$  C.), the disappearance is rather due to phagocytosis. They inoculated cultures and toxins in the anterior chamber, the iris, ciliary body, vitreous, and optic nerve sheath. Inoculation of cultures or toxins in the anterior chamber resulted almost uniformly in a plastic iritis, which spontaneously recovered within three weeks, leaving posterior synechiæ. When a culture was inoculated, the iritis appeared by the next morning and was accompanied by a papillitis. Inoculation of the iris with cultures caused a plastic inflammation with hypopyon, which recovered within thirty-five days, leaving no synechiæ. Inoculation of the ciliary body was negative in two experiments. Inoculation of the choroid with cultures produced no changes visible with the ophthalmoscope, but caused a granular degeneration of the outer layers of the retina. Inoculation of cultures or toxins in the vitreous caused a mild plastic iritis, with a hyalitis along the line of puncture, which was later absorbed; in several cases this was accompanied by an optic neuritis and an atrophy of the choroid and of the outer layers of the retina. The introduction of bacteria or of toxins into the sheath of the optic nerve caused a severe papillitis that resulted in atrophy. The gonococcus seems to have a selective toxic action on the neuroepithelial elements of the retina and on the optic nerve, and its pathogenic effect seems to be chiefly due to toxins. At least bacteria were never found in the tissues of the rabbit's eye. The spontaneous recovery of infections of the anterior segment seems to be peculiar to rabbits, and may perhaps be due to a certain degree of immunity dependent on the high body temperature.

CAUSÉ.

GEBB (160, **Therapy of diplobacillus infection of the eye**) finds experimentally that certain coloring matters are able to affect diplobacilli in vitro and in the conjunctival sac of rabbits so that their growth in artificial media is inhibited. Clinical experiments likewise show a distinct action of the coloring matters upon the diplobacilli, in that affections of

the conjunctiva and lid caused by diplobacilli heal comparatively quickly under such treatment. Ulcers caused by diplobacilli are less amenable. These researches confirm to a certain degree the claims of Stilling in 1890 concerning the usefulness of certain aniline colors in ophthalmology, and give rise to the hope that better results in the treatment of diplobacillus infections may be attained by the development of this means than have been reached heretofore.

K R.

V. ISSEKUTZ (162, **Synergism of local anæsthetics**) ascertained by mixing different anæsthetics in various concentrations that antipyrin greatly increases the effect of cocaine, considerably that of eucain B, and slightly that of novocain. The latter increases the effect of eucain B considerably. Mixture of cocaine and eucain B, and of cocaine and novocain, showed a simple additional effect.

CONTINO (158, **Electric introduction of ocular anæsthesia**) concludes that alypin, cocaine, or holocain must be used if anæsthesia is to be obtained by means of iontophoresis. The inflammation caused by the electric introduction of holocain limits the choice to cocaine and alypin, the latter being preferable as almost quite unirritating. In this way complete anæsthesia of the skin may be produced for ten minutes, but if a few drops of adrenalin are added to the solution of cocaine, or of alypin, the anæsthesia may be prolonged to three hours. A current of five milliamperes is applied for six minutes, the positive pole applied locally, the negative held in the hand of the patient.

CALDERARO.

#### IV.—METHODS OF RESEARCH, REMEDIES, INSTRUMENTS, AND GENERAL OPERATIVE TECHNIQUE. Reviewed by LOEHLEIN.

168. ABADIE. **Ocular tuberculosis and its treatment.** *Société française d'ophtalmologie*, M y, 1912.

169. BEAUVIEUX. **Tuberculin and ocular tuberculosis.** *Ibid.*, May, 1912.

170. BENEDETTI. **Radioactive medicaments in ocular therapeutics.** *Ibid.*, May, 1912.

171. BIELSCHOWSKY. **A new prism apparatus.** *Ophth. Soc. of Heidelberg*, 1912.

172. BIRCH-HIRSCHFELD. Some instruments for exophthalmometry and scotometry. *Ibid.*, 1912.

173. DARIER. Tuberculin and ocular therapeutics. *Soc. française d'ophtalmologie*, May, 1912.

174. MOURADIAN. The practical value of Wassermann's reaction in ophthalmology. *Annales d'oculistique*, cxlvii., p. 1.

175. ROLLET and DURAND. Measurement of protrusions of the eye. *Revue générale d'ophtalmologie*, xxxi., p. 193.

BIRCH-HIRSCHFELD (172, Instruments) exhibited—1. A little apparatus with which to test the central color sense, composed of two disks movable upon each other. One disk contained test colors and mixed colors, the other apertures from 2 to 12mm in diameter. This apparatus permits of an instantaneous change of the test colors while the same distance is maintained. A scale at the back gives the size of the diseased area of the retina, corresponding to the size of the scotoma found in any case. 2. A modification of Priestley-Smith's scotometer to which certain improvements are made. 3. A simple and cheap device for the measurement of exophthalmus by means of photography. The outer margin of the orbit is marked by a line of pigment, or a strip of plaster. The head of the patient is fixed in a head-rest with a forehead support, the primary position of the eyes secured by fixing on a certain mark, and then a profile picture is taken with a camera at a certain distance. Just in front of the center of the pupil on the forehead support is a millimeter scale at the same distance from the objective as the apex of the cornea. The relations of the latter, as well as the outer margin of the orbit, to the scale may be secured by photography, or by tracing on tracing paper laid on the glass plate. The camera is then moved to the other side of the patient, who does not change his position, and the procedure is repeated. If a lens of seven diopters is used as the objective of the camera, the distance of the objective from the middle line is made 24cm, and the length of the camera is 36cm, a double linear enlargement is obtained, which facilitates the delineation and the measurement.

KR.

BIELSCHOWSKY (171, A new prism apparatus) described an instrument consisting of two double prisms on a stand that can be adjusted to the height of the eyes and the distance

between them. Each of the double prisms can be deviated seventeen degrees, and the angle of deviation can be read in degrees and meter angles. On one side of the prism frame are clips to hold spherical or cylindrical glasses, or a Maddox rod. On the other side colored glasses or little diaphragms may be placed. Below the arm carrying the prisms another arm may be introduced with an apparatus for stereoscopic exercises. The uses of the apparatus are: 1, to test the balance of the eyes; 2, to determine the amplitude of fusion; 3, to measure the angle of strabismus, both objectively and subjectively; 4, to test the sensory correspondence of the retinae; 5, to excite binocular vision in strabismus; 6, to delimit exactly paracentral defects in the visual field; 7, to detect simulation of bad vision of one eye.

KR.

ROLLET and DURAND (175, **Measurement of protrusions of the eye**) describe an instrument which is essentially a modification of Hertel's exophthalmometer. It has only one mirror for each eye which reflects the apex of the cornea through a gauger so that the degree of change in the position of the eye can be read directly from the scale attached to a cross-piece. According to Rollet and Durand this instrument gives an absolutely reliable measurement, while errors of from 1 to 3mm are possible with Hertel's, through changes in the position of the observer. The authors give some clinical data as the result of studies with this new exophthalmometer. The normal position of the eye fluctuates between 12 and 14mm. The classical idea is confirmed that the eyes are small in hypermetropia, large in myopia. After tenotomy there is an exophthalmos up to 2mm. To "make a big eye" corresponds to an exophthalmos of 1 to 1½mm, and is presumably produced by a simultaneous contraction of the obliques. They present as a new fact the presence of exophthalmos in optic atrophy. Only one out of 19 such patients failed to have a protrusion of the eye, which ranged as high as 19mm. In some cases a higher degree of exophthalmos was found of the eye with an advancing atrophy. The exophthalmos of tabes, due perhaps to a hypotony of the recti, has been described many times. A protrusion of the eye to 22mm was measured in exophthalmic goitre. A protrusion of the eye was found



in 78% of the patients with nephritis. The instrument can also be used to measure senile exophthalmos.

CAUSÉ.

MOURADIAN (174, **Wassermann's reaction in ophthalmology**) discusses the practical value of Wassermann's reaction in ophthalmology on the ground of his observations in 245 cases. Although there are a number of affections of the eye that have long been known to be of certainly syphilitic origin, yet this reaction is in many cases of decisive importance. Its value is the same in syphilis of the eye as in syphilis of other parts of the body; it was found to be positive in 70% of the cases in which the diagnosis of syphilis was certain, in 45% of those in which it was probable, and in 23% of those in which it was uncertain. A positive reaction is of great value, a negative one of little. A negative reaction is obtained in 30% of syphilitics with ocular diseases; it shows neither absence, benignity, nor cure of the syphilitic process. A positive reaction indicates specially energetic anti-syphilitic treatment. It has in particular confirmed the etiology of parenchymatous keratitis as being due to hereditary syphilis, while the great number of negative reactions in cases of disease of the retina and uvea prove nothing as to the rarity of syphilis as the cause of these affections. The reaction was positive in 84.5% of the cases of parenchymatous keratitis, in 76.4% of ocular tabes, in 29.4% of iritis, in 18% of choroiditis, and in 37.9% of optic atrophy.

CAUSÉ.

BENEDETTI (170, **Radioactive medicaments in ocular therapeutics**) has treated 300 cases of trachoma with bromide of radium, almost exclusively by means of a radioactive ointment containing citrate of copper. The ointment was applied in the evening and Benedetti ascribes its beneficial influence to the radioactive constituents. Fifteen per cent. of the cases were cured within a month; forty per cent. in from forty to eighty days; the rest needed a longer time. Six per cent. proved obstinate.

CAUSÉ.

The treatment of tuberculosis of the eye was the subject of three papers at the May meeting of the Société Française d'Ophthalmologie. ABADIE (168) has obtained good results

by a method in which he gives iodogen internally, applies inunctions of guaiacol-lebertran, and has the patient eat from 60 to 190 grams of raw meat daily. The syrup of iodide and tannin is an excellent remedy in the scrofulous eye diseases of childhood. Raw meat as a food also plays an important rôle in the treatment of pulmonary tuberculosis. Injections of tuberculin are given at the same time in suitable cases. BEAUVIEUX (169) believes in very small doses in the beginning of tuberculin treatment. Starting with  $\frac{1}{1000}$  mg of the dry substance he increases the dose within two months to 1 mg. He claims that non-progressive doses unnecessarily prolong the treatment and sometimes cause severe reactions. He reports good results in three cases of disease of the anterior segment of the globe and in three cases of choroiditis. DARIER (173) has treated forty-two cases with tuberculin in the past twelve years, twenty-five successfully, five unsuccessfully. In twelve the treatment could not be carried out regularly. The only complication seen was hæmoptysis in one case.

CAUSÉ.

V.—ANATOMY, EMBRYOLOGY, MALFORMATIONS. Reviewed by PAGENSTECHER.

176. ATTIAS, G. Embryontoxon and arcus juvenilis. *Arch. f. Ophth.*, 1912, lxxxi., 3, p. 505.

177. CARLINI, VITTORIO. The construction and development of the zonule of Zinn. *Ibid.*, lxxxii., 1, p. 75.

178. LOEHLEIN, W. Anophthalmos with palpebral cyst. *Zeitschr. f. Augenheilkunde*, 27, 5, p. 406.

179. PAGENSTECHER. The causal genesis of malformations of the eye and congenital cataract. *Ophthalm. Soc. of Heidelberg*, 1912.

180. V. SZILY. The production of primary tumors in embryos and their importance in the genesis of glioma. *Ibid.*, 1912.

181. UTHOFF, W. A case of very pronounced persistent pupillary membrane in both eyes. *Klin. Monatsbl. f. Augenh.*, April, 1912, p. 476.

ATTIAS (176, *Embryontoxon and arcus juvenilis*) suggests as clinical characteristics by which the arcus juvenilis can be distinguished from the arcus senilis, that the latter is usually better marked above, the former below, and that the former has the sharper line of demarcation.

According to CARLINI (177, *The zonule of Zinn*) the zonule does not belong embryologically to the retina, but is differ-

entiated from the anterior part of the vitreous. The question whether the vitreous is of mesodermal or ectodermal origin, he leaves open.

PAGENSTECHER (179, **Malformations of the eye**) produced malformations of the anterior chamber experimentally by overfeeding pregnant rabbits with naphthalin. In some the development of the anterior chamber was completely inhibited, others had congenital posterior and anterior synechiæ. In one case the pupillary membrane had not been separated from the mesoderm of the cornea in an animal seven days old that had cataract. Inhibitions of development of the endothelium of the anterior chamber indicate relations to congenital internal ulcer of the cornea. True central, polar, and spindle cataracts were produced. An experimental malformation of the retina, a disturbance of the development of the zonule of Zinn, and an experimental malformation of the lens, rupture of the posterior capsule, were obtained in the last third of the pregnancy. Breeding experiments with a malformed animal gave normal progeny in only two generations.

KR.

V. SZILY (180, **Production of primary tumors in embryos**) has made a great many experiments to solve the question how far toxic influences take part in the origin of typical malformations of the eye. He does not confirm Pagenstecher's observations, and says that of the many observations made by that author there is only one of a truly typical malformation of the eye, and this may have been an accident. His verdict concerning the toxic origin of typical malformations of the eye is that it has not been proven to exist.

KR.

LOEHLEIN (178, **Anophthalmos with palpebral cyst**) demonstrated histologically that the cyst was a rudimentary eye. The posterior segment of the cyst contained a pigment membrane, the anterior segment a rudimentary retina. The time of the disturbance in development is placed by him before the time of the transformation of the primary into the secondary optic vesicle.

UHTHOFF (181, **Persistent pupillary membrane**) reports a case in which the persistent pupillary membrane interfered so much with vision that both eyes had to be operated on.

VI.—PHYSIOLOGY OF NUTRITION AND INTRAOCULAR TENSION. Reviewed by WESSELY.

182. VAN DER HOEVE. Osmotic pressure and electric conductivity of intraocular fluids and blood serum of animals. *Arch. f. Opth.*, lxxxii., 1, p. 58.

183. KNAPP. Influence of massage upon the tension of normal and glaucomatous eyes. *Klin. Monatsbl. f. Augenheilkunde*, June, p. 691.

184. MAWAS. The quantity of cholesterin in the normal aqueous, in the aqueous after paracentesis, and in the aqueous in senile cataract. *Soc. d'ophtalmologie de Paris*, March 5, 1912.

185. WESSELY. Study of the intraocular tension. *Ophthalm. Society of Heidelberg*, 1912.

VAN DER HOEVE (182, Osmotic pressure and electric conductivity of intraocular fluids) concludes that there is no constant relation between the osmotic pressure of the intraocular fluids and that of the blood serum in the sense of a hypertony of the fluids in the eye, but that these may be sometimes hypertonic, sometimes hypotonic. The intraocular fluid is often hypertonic to the arterial blood, and hypotonic to the venous. All these differences are probably explained by the slow renewal of the fluids in the eye and furnish no objection to the transudation hypothesis.

MAWAS (184, Cholesterin in the aqueous) found the amount of cholesterin in the aqueous ten times as great after puncture of the anterior chamber as in the normal, and he could not make out an increase in eyes with cataract.

WESSELY'S (185, Study of the intraocular tension) first series of experiments dealt with the dependence of the intraocular tension upon the blood pressure. Although in general the tension curve gives a true reflection of the blood pressure curve, yet deviations occur as soon as the change of blood pressure is caused by changes in the caliber of the peripheral vessels and these prevail in the eye. For the eye is to a certain degree an onkometer, and its tension depends not only on the pressure, but also on the fullness of the vessels. Faradization of the sympathetic, or intravenous injections of adrenalin, cause the tension of the eye to fall in spite of an increase of pressure in the carotid. The cases are clinically important in which the tension is increased by intraocular vasodilatation, as when the blood-vessels of the head and brain dilate with reduced pressure after the administration



of amyl nitrite, caffein, and antipyrin. Aside from the fact that these drugs may thus occasionally excite an attack of glaucoma, an interesting point is the harmony between the innervation of the vessels of the brain and of the eye, which goes to prove the importance of the movement of the blood in the physiology and pathology of the intraocular tension.

Other experiments were to determine the influence of the movements of the eye upon the intraocular tension. An increase of tension with every turn of the eye was demonstrated on one human eye, and on the eyes of monkeys. In the latter the least increase was made by the trochlearis, a greater one by the abducens, and the greatest by the oculomotorius, showing a marked difference in the influence exerted by the straight and the oblique muscles.

Finally Wessely made observations with Schioetz's tonometer. As the tonometer never measures the intraocular tension as such, but always a combination of this with the impressibility of the wall of the globe, and as only cadaveric eyes could be used, the calculations as to absolute heights of tension could have a claim to accuracy only if (1) the elasticity of the cornea of the cadaveric eye was the same as that of the living, (2) the elasticity of the wall of the globe was the same in all individuals, if the elasticity of the sclera was unimportant. But this is the case in neither respect. The elasticity of the cornea changes gradually in the cadaver, and the yielding or rigidity of the sclera has a very marked influence on the results obtained by the tonometer. Although the instrument is so valuable for the detection of relative differences of tension, yet the absolute values found by it must not be overestimated, and Wessely sees a danger that the diagnosis of glaucoma may be made and operations performed, because of high readings of the tonometer in the absence of other clinical symptoms.

KR.

KNAPP (183, **Influence of massage upon the intraocular tension**) finds that massage of the eyeball through the lids with the fingers markedly reduces the tension of normal eyes within a few minutes, and that it takes the tension about three quarters of an hour to regain its normal height. In experiments on animals he could prove neither an increase of albumin in the aqueous, nor a rapid entrance of fluorescin, so

he supposes that the aqueous is regenerated in the same way that it is normally produced. In acute glaucoma, massage is usually ineffective; in mild attacks, or in glaucoma simplex, it almost always results in a decrease of tension after a quarter of an hour. The effect is greater and more lasting in eyes that have been operated on for glaucoma. If a considerable decrease of tension can be secured by massage several weeks after the operation the prognosis is good. But in exceptional cases massage may cause an increase of tension. Holocain reduces the tension in a large number of normal eyes, when it has been instilled several times.

#### VII.—PHYSIOLOGY AND PATHOLOGY OF THE SENSE OF SIGHT.

Reviewed by KÖLLNER.

186. BRUECKNER. **The galvanic excitability of the eye.** *Ophthalmological Society of Heidelberg*, 1912.

187. LENZ. **Central color-blindness.** *Berl. klin. Wochens.*, p. 766.

188. SCHANZ, F. **Apparatus for observing the fluorescence of one's own eye, and the impairment of the vision by the fluorescent light.** *Ophthalmological Society of Heidelberg*, 1912.

189. SPOTO, G. **Colored protective glasses.** *Ann. di Ottalm.*, p. 165.

190. THIERFELDER. **The processes that take place in the retina.** *Beitraege z. Augenheilkunde*, 80, p. 1.

Central acquired color-blindness is always to be ascribed to a bilateral hemianopsia, according to LENZ (187, **Central color-blindness**), due usually to hemorrhages, or foci of softening. In the retrogression from total color-blindness blue is the first color to be recognized. Lenz denies the existence of a special center for the sense of color for various reasons. The color sense is probably only a higher, and therefore more easily injured, function of the visual center that is situated in the region of the calcarine fissure.

BRUECKNER (186, **Galvanic excitability of the eye**) has studied the question whether the condition of adaptation of the eye influences its galvanic excitability. He used fluid electrodes to carry the current and found, contrary to former writers, that adaptation to the dark produces an increase of sensibility. According to the strength of the current light phenomena may be perceived in the extreme periphery of the visual field, in the center, or in the region of the blind spot when the circuit is opened or closed. The increase in sensi-

tiveness in adaptation to the dark can be demonstrated only with the light phenomena in the center, or in the region of the blind spot; it is about double the sensitiveness in adaptation to light.

SCHANZ'S (188, **Apparatus for observing fluorescence**) apparatus for observing the fluorescence in one's own eye consists of a black box with a dark blue glass in one side wall and a mirror on its rear wall. If this box is held before the face like a stereoscope, in such a position that diffuse daylight from the window falls upon the eye after passing through the blue glass, the observer sees his pupil bright gray in the mirror, looking as if he had a ripe senile cataract. A great part of the visible rays of the diffuse daylight are cut off by the blue glass, while the blue, violet, and ultraviolet rays reach the eye. Only a portion of these rays act directly upon the light perceptive portions of the retina; another portion is transformed in the media of the eye, especially the lens and retina, into light of great wave length, so that these parts of the eye appear fluorescent. The fluorescence of the lens is so lively that the pupil appears to be bright gray. The phenomenon is particularly beautiful when the experiment is made with direct sunlight, or an electric arc-light.

KR.

THIERFELDER (190, **The processes that take place in the retina**) advances a new theory of vision, or at least of the processes that take place in the retina. In front of each cell lies a regeneration cell, the two connected by a "canal." The parts are surrounded by a photochemic neutral fluid. The inner limbs of the visual cells are permeated by the visual substance, which passes out again through the wall of the cell. The cell wall is the terminal apparatus of the nerves. "The different meridians are tuned to the different kinds of color molecules, like the rods of Corti's organ." The "violet meridian adjoins the red meridian." The inner limb of the visual cell represents an optical lens, the outer limb acts like a mirror. The rays that fall upon the inner limb are focused upon the outer limb, which reflects them. The visual cells and the regeneration cells appertaining to them have certain conflicting properties: the latter disperse light, the former collect it; osmotically, "the one forces the used visual mole-

cule outwards, the other, the regeneration cell, absorbs it." The visual substance is sensitive to light in all parts, yet yellow molecules are tuned only to yellow rays. Elsewhere the visual substance is not renewed, but undergoes regeneration only in the affected cells. Increase of light accelerates the circulation of the molecules, decrease retards it; this explains adaptation. The red molecule acts with double the energy of the last violet molecule; an explanation of Purkinje's phenomenon.

SPOTO (189, **Colored protective glasses**) has studied the chemical reaction of variously colored glasses used for protecting the retina from the action of the sun. He ascertained the degree of absorption of the differently colored glasses by means of photometric measurements, and studied the modifications which the different rays of the spectrum undergo under the influence of colored glasses, and determined the vision and light sense of different persons under the same conditions. He obtained the best results with Fieuzal and yellow glasses. This supports the claims made for the protective glasses, that they completely neutralize the violet rays, which are beyond doubt very tiring to the sensitive elements of the retina, and increase considerably the brightness of objects.

CALDERARO.

#### VIII.—ACCOMMODATION AND REFRACTION. Reviewed by KÖLLNER.

191. BEAUVIEUX and DELORME. **Bilateral paralysis of the accommodation.** *Arch. d'ophtalmologie*, xxxi., p. 163.

192. CABANNES and MARCAT. **Spasm of the accommodation and astigmatism of the crystalline lens.** *Ibid.*, p. 93.

193. HESSE, R. **The contraction of the pupil in near vision.** *Klin. Monatsblätter f. Augenheilkunde*, June, 1912, p. 740.

194. KAHN. **Binocular union of one's own pupils.** *Arch. f. d. ges. Physiologie*, vol. 145, p. 249.

195. OLOFF. **A case of persistent paresis of the accommodation after diphtheria.** *Klin. Monatsbl. f. Augenheilkunde*, May, 1912, p. 551.

196. ROELOFS. **The association of accommodation and convergence.** *Inaug. Dissert.*, Amsterdam.

197. SCHUKOFF. **The relation of vision to errors of refraction.** *Diss.*, St. Petersburg.

198. UHTHOFF. **Demonstration of the process of accommodation.** *Trans. of the Ophthalmic Society of Heidelberg*, 1912.



UHTHOFF (198, **Demonstration of the process of accommodation**) had the opportunity to observe a child seven years old who had a total congenital irideremia with relatively good vision and good powers of accommodation. He was able to study the changes that take place in the anterior segment of the globe during accommodation, both when the latter was voluntary and when it was induced by eserine. Thus he was enabled to perceive the advance and swelling of the ciliary processes, the diminution in the circumference of the lens, slight irregularities in the marginal contour of the lens, and a narrow, bright circular zone along the equator of the lens.

KR.

A binocular union of one's own pupils can be readily perceived, according to KAHN (194, **Binocular union of one's own pupils**), if one looks into a mirror with parallel eyes. He then sees one cyclopic eye with two inner canthi, while the bridge of the nose appears as a crossed double image. He can then regard in turn the margin of the pupil, the corneal reflex, the posterior lenticular reflex, and make a number of interesting physiological observations. The sinking of the lens during strong accommodation, due to relaxation of the zonula, can be recognized from the sinking of the lenticular reflexes.

The contraction of the pupil in near vision may be produced wholly by the accommodation without connection with convergence, as is proved by HESSE (193, **The contraction of the pupil in near vision**). In four cases of unilateral paresis of the oculomotorius the patients were directed to fix on a near object with the paralyzed eye. The excluded healthy eye immediately assumed a position of marked secondary deviation, and yet its pupil contracted strongly. Experiments on himself also showed that attempts to accommodate with the eyes kept parallel, as with stereoscopic pictures, always induced contraction of the pupil.

C. OTTO ROELOFS (196, **The association of accommodation and convergence**) investigated the etiological importance of errors of refraction to the form of strabismus. In the first part of his work he details his studies on his own eyes concerning the nature, origin, intensity, and relaxation of the synergy of accommodation and convergence, which is not congenital, but is developed by practice and experience. The second

part contains his studies of the muscle balance of about 200 eyes. He finds that the errors of refraction are not directly accountable for the form of strabismus, as taught by Donders, but indirectly, through their influence upon the development of synergy of accommodation and convergence. With good binocular vision there is a tendency to orthophoria. With weak binocular vision hypermetropia is a frequent cause of esophoria, myopia of exophoria. When binocular vision for distance is absent in myopia, but present for near, esophoria may be produced in myopia from the development of a synergy of retinal stimulation and convergence.

B. P. VISSER.

CABANNES and MARCAT (192, **Spasm of the accommodation and astigmatism of the crystalline lens**) made careful studies in fifty cases concerning the spasm of the accommodation and the lenticular astigmatism, measuring very carefully the refraction of the principal meridians of each eye both before and after atropinization. They found differences in the lenticular astigmatism of between 2 and 3 diopters, with unlike behavior when the refraction was identical. They conclude that the eyes of children should always be atropinized for an examination of the refraction.

CAUSÉ.

BEAUVIEUX and DELORME (191, **Bilateral paralysis of the accommodation**) observed a bilateral paresis of the accommodation in a workman who had a burn of the first and second degrees of the face and the right forearm, while the function of the sphincter iridis was preserved. They are unable to give a satisfactory explanation of the origin of this paresis, but think it may possibly have been caused by intoxication from the use of compresses wet with concentrated picric acid which were applied for several hours immediately after the injury. In other respects the eyes were in a normal condition.

CAUSÉ.

OLOFF (195, **A case of persistent paresis of the accommodation after diphtheria**) reports the case of a sailor, 20 years of age, otherwise healthy, who had had a sore throat four years before, followed by a paresis of the accommodation which had persisted ever since. The possibility of some other cause

was taken into account, but it was rendered improbable by a careful examination.

SCHUKOFF (197, **The relation of vision to errors of refraction**) concludes from his studies that the impairment of vision and the degree of myopia are in no way proportional to each other. The vision may vary greatly with the same degree of myopia, and this may be the case in an individual patient. He likewise finds no relation between the vision of the unaided eye and the degree of hypermetropia. In one case of hypermetropia of 6 D. the vision was  $\frac{2}{10}$ , and yet the vision may be much impaired by a low degree of hypermetropia. A fixed proportion between the different kinds of astigmatism and the vision in like manner could not be established. The same power of vision is often present in various degrees of ametropia.

V. POPPEN.

IX.—THE MOTOR APPARATUS OF THE EYES. Reviewed by  
KÖLLNER.

199. FAGE. **Paralyses of the ocular muscles after traumatism to the margin of the orbit.** *Archives d'ophthalm.*, xxxii., p. 282.

200. FROMAGET, CAMILLE, and HENRI. **Latent nystagmus (nystagmus and strabismus).** *Annal. d'oculistique*, cxlvii., p. 344.

201. LAGLEYZE. **Congenital vertical strabismus.** *Arch. d'ophthalm.*, xxxii., p. 338.

202. LANDOLT. **Operative treatment of strabismus.** *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

203. MUENCH, K. **The vermiform twitchings of the sphincter pupillæ.** *Klin. Monatsbl. f. Augenheilkunde*, June, 1912, p. 745.

204. ORDOP. **Hereditary nystagmus.** *Inaug. Diss.*, Leipsic.

205. TERRIEN. **Paralysis of the two externi following diphtheria. Treatment by serum therapy; cure.** *Arch. d'ophthalm.*, xxxi., p. 106.

206. WEEKERS. **Voluntary nystagmus.** *Ibid.*, xxxi., p. 86.

MUENCH (203, **Vermiform twitchings of the sphincter pupillæ**) considers these twitchings to be physiological and in no way pathological. The uniformity of the contraction of the sphincter is only apparently uniform because of the rapidity of the contraction. The sphincter is composed of some seventy or eighty physiological segments, each governed by a little nerve trunk, so that it has a certain degree of independence. The length of such a physiological segment corresponds to the length of the anatomical tissue element, the smooth muscle fiber. When the pupils are more than

moderately dilated, the light is weak, and the retina is adapted, the pupils have restless movements of a distinctly peristaltic character.

ORDOP (204, **Hereditary nystagmus**) reports a family in which fourteen cases of nystagmus occurred in four generations. The nystagmus occurred only in males, but was transmitted without exception through the females.

FROMAGET (200, **Latent nystagmus**) designates by this name, to correspond with latent strabismus, a form of nystagmus that is met with only under certain conditions. He reports the case of a man 21 years old who had nystagmus as soon as one eye was excluded from the act of vision, when reading, and when the eyes were turned far to one side. One eye was amblyopic, the other had perfect vision when both eyes were used, but only one-half when the bad eye was covered. When the amblyopic eye was covered a rapid nystagmus was set up, when the good eye was covered a similar nystagmus began, but with slow oscillations. Fromaget thinks that there is a function of the eyes, like that of the tendency to fusion, which prevents nystagmus and was done away with in this case by the occlusion of either eye. Probably there was a developmental fault in a center which is in close connection with the centers of coördination for convergence and for the associated lateral movements of the eyes. The simultaneous presence of a marked hippus shows that this hypothetical center is closely connected with the movements of the pupils. Fromaget believes that hysteria and simulation were excluded in this case.

#### CAUSÉ.

WEEKERS (206, **Voluntary nystagmus**) gives the details of a case of voluntary nystagmus, a condition that is rarely observed. The patient was a young man, 20 years old, who discovered when 7 years of age that he could produce a horizontal nystagmus in any position of his eyes. The oscillations were rhythmic, very frequent, and numerous. He had no strabismus. The pupils became small and oval simultaneously with the onset of nystagmus. Both eyes were normal, and there had never been any involuntary nystagmus. Voluntary nystagmus and voluntary strabismus are closely related; they are usually met with in persons who have a



finely developed muscular sense. In all cases the nystagmus is horizontal. Probably it is caused by a direct action of the will upon the supranuclear association centers of the lateral movements of the eyes.

CAUSÉ.

LAGLEYZE (210, **Congenital vertical strabismus**) had the opportunity to observe quite a number of cases of congenital vertical strabismus. Of the seventeen patients only two had strabismus deorsumvergens, the remaining fifteen had strabismus sursumvergens. The left eye was affected in fourteen, the right in three. Four were emmetropic, five were hypermetropic, two myopic, and three had hypermetropic astigmatism. The vision of both eyes was normal in eleven. Heredity did not seem to play any part. The most striking external sign in all cases was a torticollis. The ocular etiology of the wry-neck is very often not recognized in these cases, in which all tenotomies and orthopedic measures fail to give relief, while the position of the head is usually corrected simply by the wearing of proper prismatic glasses. Binocular vision is possible only when the head is held in an oblique position, and when the head is held upright the vertical strabismus becomes manifest. In strabismus sursumvergens the head is inclined to the shoulder opposite the affected eye, while in strabismus deorsumvergens it is inclined toward the same side as the eye, just as happens in paralytic strabismus. The inclination of the head is therefore to render possible the binocular act of vision, to compensate for the loss of muscular balance. In the majority of cases the trouble was a functional disturbance of the left superior oblique, in all but one the condition was congenital, and paralytic troubles were excluded in all. In four cases Lagleyze operated successfully, tenotomy of the superior rectus with or without advancement of the inferior, but in many cases the use of proper prisms is sufficient.

CAUSÉ.

E. LANDOLT (202, **Operative treatment of strabismus**) reports a case in which the patient had first a paresis of both interni and of the left externus. Advancement of both interni permanently restored the power of convergence. Thirteen years later the inferior rectus of the same patient became

paretic. Complete recovery followed advancement and resection of the affected muscle. The patient has perfect binocular vision, normal amplitude of convergence, and can do his work.

KR.

**TERRIEN (205, Paralysis of the two externi following diphtheria)** describes a case of bilateral paresis of the abducens six weeks after a slight attack of diphtheria. The velum was paretic at the same time, but the accommodation and the other muscles of the eye were not affected. The symptoms of paresis disappeared as suddenly as they came two days after the injection of 4ccm of serum. Bilateral paresis of the abducens after diphtheria occurs very rarely, and the views concerning the efficiency of the use of serum in post-diphtheritic pareses are still divided.

CAUSÉ.

**FAGE (199, Paralysis of the ocular muscles after traumatism to the margin of the orbit)** shows that paralyzes of the ocular muscles after contusions of the bony margin of the orbit are not as rare as appears from the small number recorded in literature. He reports 3 cases that have come under his own observation. In one a lasting paresis of the superior rectus of a boy of 10 years old was caused by a blow received from the head of another boy. He thinks that the fibers of the muscle were extensively torn. In another boy, 16 years old, a blow on the lower margin of the orbit caused a paresis of the superior oblique which never recovered completely. In the third case, a girl, 15 years old, received a blow that fractured the upper jaw and caused a paresis of the rectus inferior, which recovered in a short time. The cause of such a paresis may be: pressure upon the muscles by an effusion of blood into the orbit, partial rupture of the fibers of the muscle, hemorrhage into the sheath of the muscle, stretching of the muscle or inflammatory changes in the peripheral nerve fibers. The prognosis is very doubtful.

CAUSÉ.

X.—LIDS. Reviewed by KRAUSS.

207. **CHRONIS. Radical operation for the cure of trichiasis and entropion of the two lids.** *Arch. d'ophtalm.*, xxxi., p. 100.

208. ELSCHNIG. **Modification of Hess's operation for ptosis.** *Klin. Monatsblätter f. Augenheilkunde*, May, 1912, p. 595.

209. KRAUSS, W. **The smooth muscles of the eyelid.** *Med. Klinik*, 17, p. 715.

210. MORAX and LANDRIEU. **Hyaline degeneration of the subconjunctival and epitarsal tissue of the two upper lids.** *Ann. d'oculistique*, cxlvii., p. 25.

KRAUSS (209, **The smooth muscles of the eyelid**) designates the system of smooth muscle fibers found in the anterior portion of the orbit as the membrana orbito-palpebralis musciosa. He shows that it has no direct relations with either the eyeball or the septum orbitale, while relations are present with Tenon's capsule, the levator, the conjunctival sac, the palpebral portion of the lachrymal gland, the accessory glands, and the smooth muscles of the veins passing through the anterior portion of the orbit. The membrana orbito-palpebralis musciosa has not only purely motor, but also vaso-motor and secreto-motor functions, which are of special importance to our understanding of the lid symptoms in exophthalmic goitre.

MORAX and LANDRIEU (210, **Hyaline degeneration of the subconjunctival and epitarsal tissue of the two upper lids**) saw a case of this nature in a woman 60 years of age, who had never before had any trouble with her eyes, and gave no antecedents in her history which could be brought into connection with her present disease. Both lids were so very thick that she could move them only a little, and they could not be everted without instrumental aid. Numerous subconjunctival hemorrhages had taken place in the course of the disease, which at this time had lasted three years. In the upper transition fold were large tumor-like hypertrophies which were placed upon and behind the thickened tarsus and crackled under the knife during the extirpation. A prolonged mercurial treatment was ineffective, but the operative removal of the hypertrophic parts brought about a material improvement. Embedded in the subconjunctival tissue were hyaline masses that had undergone granular degeneration, with numerous zones of ossification. Cases of hyaline and of amyloid degeneration of the conjunctiva are not very common, of the former about twenty cases have been recorded. The hyaline has frequently been considered an early stage of

amyloid degeneration; in a third of all cases the disease was bilateral. The pale yellow, irregular, hypertrophic appearance of the conjunctiva, and the thickening and broadening of the tarsus that can be felt, are to some degree characteristic. Half of the cases that have been met with were also cases of old trachoma. The majority of the patients were from 25 to 30 years old, and the commencement of the disease in the 56th year is exceptional. The diseases from which it needs to be differentiated are lymphoma, leucosarcoma, cicatricial trachoma, and certain forms of tuberculous conjunctivitis and specific tarsitis.

CAUSÉ.

CHRONIS (207, **Radical operation for trichiasis and entropion**) recommends the thinning of the tarsus, which was devised by his father and has recently been described as a new operation under the name of tarsoleptinsis, and emphatically claims priority. The skin of the lid is incised 2 to 3mm above the free margin, the palpebral muscle is excised so as to lay bare the tarsus, which is then thinned with a knife, and sutures are introduced which are tied at the ciliary margin. Finally an intermarginal incision is made.

CAUSÉ.

ELSCHNIG (208, **Modification of Hess's operation for ptosis**) uses a piece of the fascia lata for the fixation of the lid skin and has obtained good cosmetic results in this way. He also obtained an excellent result in a case of congenital ptosis through the advancement of the levator.



## BOOK REVIEWS.

**VIII.—Lehrbuch der Augenheilkunde** (Text-Book of Ophthalmology). By AXENFELD, with the collaboration of Bach, Bielschowsky, Elschmig, Greeff, Heine, Hertel, v. Hippel, Krückmann, Oeller, Peters, and Stock. Third edition, pp. 761. Jena, G. Fischer, 1912. Price 15 Marks.

This new edition has been revised and enlarged; new illustrations have been added; the text has been somewhat rearranged.

The book, written by those to whom the teaching of Ophthalmology in the German Universities is intrusted, is a striking tribute to the scientific character of this instruction. The wealth and excellence of the many colored illustrations constitute one of the most important features of the book.

A. K.

**IX.—Electricity in Diseases of the Eye, Ear, Nose, and Throat.** By W. FRANKLIN COLEMAN, Chicago. Pp. 595. The Courier-Herald Press, 1913.

After introductory chapters on the Physics and Therapeutic use of Electricity, the various diseases of the parts described in the title are taken up in turn, and the successful manner in which they were treated by electricity is described. In the part on the eye, aside from the generally accepted value of the galvano-cautery in corneal ulcers and keratoconus, and the extraction of intraocular particles of steel with the giant or hand magnet, no evidence is brought of the value of electricity in the treatment and cure of practically all other affections.

A. K.

**X.—Diseases of the Eye.** By J. HERBERT PARSONS, London. Second edition, pp. 684. Philadelphia, P. Blakiston's Son & Co., 1912. Price, \$2.50 net.

This text-book, which was favorably reviewed in these ARCHIVES when it was first published, now appears in a second edition, with more illustrations and a revised text. It represents a well-balanced, scientific treatise, and occupies one of the first places among the medium-sized text-books on the eye.

A. K.

**XI.—Outlines of Applied Optics.** By P. G. NUTTING, Assoc. Physicist, Bureau of Standards, Washington, D. C. Pp. 234, with 73 illustrations. Philadelphia, P. Blakiston's Son & Co., 1912. Price, \$2.00.

This little book deals with optical instruments and optical measurements, which the author defines as belonging to optical engineering, a branch practically untaught in any university. It has been prepared for those who design instruments, measure colors, examine eyes, and identify illuminants. These are all important subjects with practical bearing, which many will find worthy of careful study.

A. K.

**XII.—Die Sehschärfe des Menschen und ihre Prüfung** (Human Visual Acuteness and its Determination). By Dr. LEOPOLD LÖHNER, Graz. Pp. 136. Leipzig and Vienna, Franz Deuticke, 1912. Price, 4 Marks.

This monograph treats the important chapter in physiologic optics on acuteness of vision. For its determination no less than 73 test-objects and charts have been devised, which to the author's mind proves that the question has not been finally solved. At the same time he wishes to approach the subject on a broader plane, and bases his study on investigations on the physiologic foundations of visual acuity. He is inclined to regard acuteness of vision as the visual act of the dioptrically normal eye. Dot-objects and letter-objects should not be considered of equal value. Dot-objects furnish a valuable means to discover certain variations of vision which are not recognized by letter-tests; for ophthalmological purposes they can, however, not be made practical on account of many possible errors.

A. K.

**XIII.—Diagnostik der Farbensinnstörungen** (Diagnosis of

Color Blindness). By Professors STARGARDT and OLOFF, Kiel. Pp. 45. Berlin, Julius Springer, 1912. Price, 1.80 Marks.

The authors of this unusual little book succeed in bringing in 46 pages everything essential in the examination for color blindness or color deficiency. It well deserves an English translation, and ought to be a "vademecum" for all who are interested in railroad or similar examinations.

The first part of the book deals with the two theories of color perception and its anomalies. The second part gives the diagnostic value of the different methods of examination. The authors conclude that an absolute diagnosis of color blindness or color deficiency can be established only by the use of Nagel's "Anomaloskop." For cursory examinations, Stilling's test-cards are sufficient and answer every purpose, while those of Nagel are apt to be deceptive. Absolutely unreliable are Holmgren's tests and any tests which represent an imitation of railroad signals.

E. SCHALCK.

**XIV.—Die Anomalien der Skleralspannung** (Anomalies of Scleral Tension). By Dr. HUGO STRANSKY, Brunn. Volume I. Pp. 243. Leipzig and Vienna, Franz Deuticke, 1912. Price, 6 Marks.

Scleral tension depends not only on intraocular pressure, but on the rigidity of the sclera itself. This scleral rigidity the author regards of great importance in glaucomatous conditions. He therefore has set to work to study the laws which govern scleral tension, and believes to have discovered the true nature of simple glaucoma, and that a number of physiologic and pathologic conditions and processes in the eye stand in causal relation to scleral tension and its variations. This Volume I. treats of glaucoma inflammatorium, the senile eye, the scars of the sclera, and glaucoma simplex (Part 1).

A. K.

## NOTICES.

### XIIITH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

(ST. PETERSBURG, JULY 28-AUGUST 2, 1914.)

Ist. Circular

St. Petersburg, December, 1912

Dear Colleague: To prepare for the Congress which stands under the protection of His Majesty the Emperor, a central bureau was founded in St. Petersburg.

The members of this bureau are: the professors of ophthalmology from our universities, representatives of ophthalmological societies, as well as oculists from several important towns of the Empire.

The central bureau took care to invite renowned oculists from all civilized states as corresponding members. All those members form the international organization committee.

According to the usual custom we have conferred the honorary presidency on our eminent colleague, Professor ARNALDO ANGELUCCI (Naples).

In the regulation of the XIIth Congress, the rules adopted at the Xth and XIth Congresses have been taken into consideration.

Until now the official languages at Congresses have been English, French, and German. In Naples, Italian and Spanish were added. This time, we unite with them the Russian language.

We request the authors who want to make a communication, to express the principal ideas, thesis, and conclusions of their work in French; otherwise it is impossible to discuss, which is the principal aim of the Congress.



Will you kindly transmit in time your participation in the Congress, directly or through intervention of corresponding members from your country? We hope that you will take an active share in the work of the meeting in St. Petersburg.

All information and circulars which the organization of the Congress publishes will be sent to you by one of the representatives of your country.

With collegial greetings

Professor *L. G. Bellarminof*.

President of the central bureau and of the international organization committee.

Professor T. GERMANN, the General Secretary, wishes to announce that it is only essential for those speaking in Russian, Italian, and Spanish to add an abstract in French to their discussion. The subjects selected for discussion are:

- I. The Etiology of Trachoma, and
- II. The Nutrition of the Eye.

Professor AXENFELD will deliver the address on the first theme, while the second will be treated by Professor ANGE-LUCCI. Lieutenant-Colonel HENRY SMITH, of Amritsar, India, will speak on his method of cataract extraction.

## XVIITH INTERNATIONAL CONGRESS OF MEDICINE.

(LONDON, AUGUST 6 TO 12, 1913.)

We are asked by the Secretaries of the Section of Ophthalmology to recall to our readers the following Rules of Congress:

The titles of all Independent Papers should be announced to the Central Office of the Congress by the 30th of April, 1913. Any papers offered after the 30th of April, 1913, will be placed upon the agenda only after the discussion of those which have been announced before this date and have been chosen by the Council of the Section. No paper will be accepted unless the title has been received by the Secretaries of the Section before the 1st of July, 1913. The text of every communication must be typewritten. Independent Papers may be written in English, French, German, or Italian.

## B. SECTION IX.—DISEASES OF THE EYE.

*President:* Sir HENRY SWANZY, M.D., F.R.C.S.I.

*Secretaries:* E. TREACHER COLLINS, F.R.C.S.  
J. B. LAWFORD, M.D., C.M., F.R.C.S.  
GEORGE MACKAY, M.D., F.R.C.S.Ed.  
LOUIS WERNER, F.R.C.S.I.

Thursday, August 7th. 1. The Pathogenesis of Chronic Uveitis, with the exception of syphilitic, tuberculous, and sympathetic forms, by Professor Dr. ERNST FUCHS, of Vienna, and Professor DE SCHWEINITZ, of Philadelphia, U. S. A.

Friday, August 8th. 2. Operations for Glaucoma with special reference to the comparative results of iridectomy and its newer substitutes by Professor LAGRANGE, of Bordeaux, and Professor PRIESTLEY SMITH, of Birmingham.

Saturday, August 9th. 3. A Demonstration or a Discussion on a theme not yet decided upon.

Monday, August 11th. 4. Diseases of the Eye caused by improper light action, by Professor CARL v. HESS, of Munich, and JOHN H. PARSONS, F.R.C.S., of London.

Tuesday, August 12th. 5. Anaphylaxis in its Relation to Ophthalmology, by Dr. V. MORAX, of Paris, and Dr. AUREL v. SZILY, of Freiburg-i.-Br.

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On September 18, 1913, Professor JULIUS HIRSCHBERG will celebrate his seventieth birthday. Those who have been his pupils, intend to honor the eminent ophthalmologist by presenting him with an artistic tablet, and request contributions toward a fund for this purpose.

These contributions should be sent to Dr. W. MÜHSAM, Berlin, W. 30, Motzstrasse 79, Germany.



Fall I.



Fall II.

Krusius-Clausen, Konjunktivitis Parinaud.







Fig. 1.



Fig. 2.

Hack, Ein Fall von Eversion des Pigmentblattes der Iris.



## ARCHIVES OF OPHTHALMOLOGY.

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### THE USE OF VACCINES IN EYE INFECTIONS.<sup>1</sup>

BY JAMES GARFIELD DWYER, A.M., M.D.,  
INSTRUCTOR IN BACTERIOLOGY IN THE COLLEGE OF PHYSICIANS AND  
SURGEONS, COLUMBIA UNIVERSITY, NEW YORK; ASSISTANT  
SURGEON, MANHATTAN EYE, EAR, AND THROAT  
HOSPITAL, NEW YORK CITY.

**D**URING the past few years, every medical journal contains some reference to the treatment of infections with vaccines and the use of the latter has now come to be a recognized and easily applied form of treatment. In 1910 the writer published the results of vaccine treatment in a series of infections of the eye, ear, nose, and throat. Since that publication, the series has grown to cover three hundred, and time has only served to strengthen his conclusions, then stated, namely, that in the vaccines, properly used, we have an agent that has no equal in certain cases.

During the past three and a half years, I have treated a series of cases of recurrent hordeola, and of these, 27 finished a course of vaccine injections. Some that only came for a couple of injections are not included. Of the 27, 24 have been, and I think will be, free from the attacks since treatment; one did not seem to improve at all; two are still under treatment. In all the 27, I found some strain of the staphylococcus; in the majority the aureus, in others the albus, and in a few the citreus. In all I used the autogenous vaccines, prepared by us in the Bacteriological Laboratory at the College of Physicians and Surgeons. The reasons for preferring auto-

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<sup>1</sup> Read before the Section on Ophthalmology, N. Y. Acad. Med., Jan. 20, 1913. From the Department of Bacteriology, College of Physicians and Surgeons, Columbia University, New York.

genous vaccines will be dwelt upon later. The method of procedure followed in each case was as follows:—Under sterile precautions, one of the hordeola was opened, smears were made, and slant agar tubes inoculated. Blood agar inoculations were also made to promote the growth of the more fastidious organisms if they should be present. The smears were examined immediately, and the morphological examination recorded. If the patient could return in a day or so, the autogenous vaccine was then ready for use; if the patient could not return for some days, a dose of a stock vaccine, prepared from such cases by ourselves, was given on the initial visit and then the autogenous was used thereafter. The dose and time between doses were based upon the clinical condition of the patient—that is, we were guided by the clinical symptoms. An initial dose of 100 to 200 million was given and the next dose, given in about five days, was generally 200 to 250 million, and then the dose gradually increased to 1000 million. The average number of doses was about 7–8, precautions being taken to give a couple of doses after all inflammation had disappeared and the hordeola had ceased to return.

This series was limited to those cases in which the condition had lasted for years, some of the cases having been treated and refracted by the best men in New York but without any amelioration of the furuncular condition. To my mind the reason for this failure lies in the fact that we too often lose sight of the fact that the eye is only a part of the general system as a whole and is not in any way an entity by itself. In considerably over two-thirds of these cases, a history of furuncles in other parts of the system was given. Such a furuncular condition is to be looked upon as simply a local manifestation of the lowered resistance of the system as a whole to the offending organism, showing itself now as an acute tonsillitis in chronically inflamed tonsils; again as an acute catarrh of the nose, superimposed upon a chronic one; again as a furuncular condition in an inflamed and abraded canal of the ear; here, in the series reported, showing itself in the guise of small abscesses of the Meibomian glands. Thus it appears futile to treat just the local manifestations as they arise without treating the underlying general cause. To me, recurring hordeola appear simply as small local foci of suppu-



ration, due to infection with certain organisms, such foci being simply the local manifestations, exhibited by a system whose resistance to such organisms is below unity, unity being taken as the normal in an average healthy individual, whose resistance to such an organism is normal. Local treatment therefore can play only a small part in such a case. It is in this class of cases that we have such brilliant results from the use of vaccines. My results have been so uniformly good and it has become such a matter of course with me that I have come to look upon the vaccine treatment as a routine, logical, everyday measure. There is no use introducing histories in this series, as they are practically all alike. One thing that is striking is that the patients will tell you unsolicited how much better they feel generally, saying they have not felt so well in months.

I wish now to refer to the other eye infections treated and will report them in brief form. Based upon the offending organism found as the cause, there were with the tubercle bacillus 12; gonococcus 6; pneumococcus 3; streptococcus 4; staphylococcus 7; Friedländer's bacillus 1; Morax-Axenfeld 2; xerosis 2; micrococcus catarrhalis 1.

The infections with the tubercle bacillus were diagnosed by the clinical symptoms and confirmed by the various tuberculin tests, such as the Von Pirquet and Moro reactions and also the tuberculin injection reaction. These infections comprised phlyctenular conjunctivitis and keratitis 5; iritis 1; choroiditis 1; keratitis 3; episcleritis 2. The results in this series have been striking. The five phlyctenular cases were cured—that is, under a course of tuberculin the recurring attacks ceased, the cases being followed for months. Of course, many other cases of phlyctenular conditions were examined, but if the tests were negative, the case was discarded as non-tuberculous.

The case of iritis, one of the most interesting cases I have seen:

J. S., a man, aged 22, when seen by me had a comparatively large circumscribed tumor nodule on the anterior surface of the iris. Wassermann was negative. A dose of tuberculin was administered, not for treatment but simply

for diagnostic purposes. There was a marked febrile reaction to the injection and two days later, much to our surprise, the mass was much smaller. Under continued tuberculin injections, the case went on to complete recovery.

The case of choroiditis is well worth reporting in detail:

A. S., aged 18, son of a physician in Rochester, was referred to me by Dr. L. W. Jones of that city, and upon examination gave me the following history:—Had never been sick a day in his life until one month previous when he had an ordinary attack of chicken-pox. Had noticed nothing wrong with his eye until one day, on taking aim with a gun, found he could not see with his right eye. Ophthalmoscopic examination revealed O. D. V.=fingers; fundus cannot be seen on account of whitish waving membrane present everywhere in the vitreous. O. S. V.= $\frac{2}{3}$ ; fundus normal. Wassermann negative. Urine negative except for great excess of indican. Patient was seen by several ophthalmologists here, the diagnosis made ranging from auto-intoxication to specific poisoning with chicken-pox. When seen by the late Dr. Oatman, he suggested tuberculosis of the choroidal vessels. The Von Pirquet reaction was decidedly positive. A course of tuberculin, mixed human and bovine, was given by Dr. Jones. Four months later patient returned to me. Vision in O. D.= $\frac{2}{4}$ ; fundus quite atrophic in choroid coat; condition quiescent.

The three cases of tuberculous keratitis rapidly became quiescent under tuberculin and I am convinced that in these cases the disease was cut short and hence the damage to the cornea much lessened. The case of episcleritis went on to full recovery.

Tuberculous eye infections are ideal ones for tuberculin treatment, as we have a fully localized process in most cases. However, I feel that the course of injections must be thoroughly controlled and the case watched, as we can easily do harm rather than good.

The six cases of gonococcus infection comprised 2 cases of iritis and 4 of conjunctivitis. One case of iritis cleared up absolutely under gonococcus vaccine alone; in the other I used staphylococcus vaccine combined with the gonococcus, as in this case the general symptoms seemed to indicate the double infection. This case went on to recovery. In the conjunctivitis cases, much larger doses of the vaccine were

used than is the general custom. The course of the disease was much shortened here I think.

Three infections with the pneumococcus were treated; two cases of serpiginous ulcer of the cornea and one kerato-hypopyon. We all know what an obstinate process a serpiginous ulcer is; these two cases cleared, one in five days, one in seven days, after the first injection. In the case of kerato-hypopyon, a very bad case, the hypopyon disappeared in two and the eye was entirely quiet in four days.

From about a dozen cases of chronic dacryocystitis, the streptococcus was isolated in four cases. Autogenous vaccines were used and recovery was obtained in the four. The smears from the other cases showed a variety of bacteria, no one variety predominating, so no treatment was followed.

The staphylococcus was used in six cases, other than hordeola; three cases of dacryocystitis and three of conjunctivitis. All cleared up under treatment. One of the dacryocystitis cases had persisted for years and was of a low grade of infection. The treatment was pursued so as to clear up the condition preliminary to a cataract operation. The operation was successfully carried through without complications.

I would like to say a word here as to the advisability of making a thorough bacteriological examination of the conjunctival sac, preliminary to operation, as very often there is a low grade of infection with some of the pathogenic organisms and this infection becomes intensified at the time of operation, so that often infection of the eye occurs and the source is looked for elsewhere, overlooking the fact that the infection may be deep in the layers of the conjunctiva and the ordinary preparation at the time of operation is not sufficient to dislodge it.

One case of chronic conjunctivitis due to the bacillus mucosus capsulatus, Friedländer's bacillus, and two cases with the Morax-Axenfeld bacillus were treated and it is surprising how quickly this form of conjunctivitis cleared up. I had been in the habit of rejecting these cases as unsuitable for vaccine treatment until lately, when upon seeing the good results reported by Allan, I treated the above with such good success.

I now come to the scientific side of the question and will



briefly consider at the beginning some necessary facts that must be stated in order to understand what is to follow. The old ways of treating infections were tonic and supportive, obviously unsatisfactory, as they did not try to get at the cause of the disease. Now, by a study of nature's own methods of defense, as seen in infections artificially produced in animals, we endeavor to imitate her and make use of the same weapons. This is the keystone of vaccine- and serum-therapy; it is around this pivot that everything revolves. In any disease we have two factors to consider: on the one hand, the invading organisms; on the other, the resisting forces of the body. Analyzing shortly the first, we find that all bacteria do not act on the body in the same way—that, in fact, their methods of attack differ widely from one another. They all have a common action in the sense that they act mechanically, just like any other foreign body introduced into the body—that is, they act by their physical presence. This is a comparatively unimportant point, its only importance practically lying in the fact that it may lead to embolism in the vessels. The vital ways in which the bacteria act may be divided practically into two classes. In the first class we have those bacteria which secrete soluble diffusible bodies in the media in which they thrive, called toxins. These toxins are readily given up to the circulating fluids of the body, and it is through the agency of these toxins that the bacteria produce their baneful effects on the body. The second class, and this is the important one for us to consider, as to it belong the organisms we have been considering above, comprises that class which elaborate within their bodies a class of substances known as endotoxins. These endotoxins are retained within the bacteria elaborating them, not being given up to the culture media or the circulating fluids, but only being set free when the bacteria are dead, or dying. It is probable that some species of bacteria act in both ways, by a soluble toxin and by an endotoxin. To the first class the tubercle bacillus probably belongs, the active toxin being an endotoxin and the soluble one being an accessory one. It was to combat this latter, the soluble one, that Koch introduced his old tuberculin, and, since the real toxin is thought to be the endotoxin, the reasons for failure of the old tuberculin are apparent.



On the other hand, we have to consider nature's ways of fighting these bacteria. When a foreign substance is introduced into the body, especially if that foreign substance is of an albuminous nature, the system, by the very presence of this material, is stimulated to the formation of what are known as antibodies—that is, bodies whose function it is to neutralize the effects of or destroy the substance introduced. Obviously these antibodies may be of many different varieties, depending on the character of the antigen calling for their formation. Applying this principle to the bacteria forming the soluble toxin, we will have the formation of an antitoxin. The examples of this class are perhaps most familiar to us, diphtheria antitoxin and tetanus antitoxin being of this nature. Against the second we would have the formation of bactericidal and bacteriolytic bodies, which would destroy and dissolve the bacteria, setting free the contained endotoxin. Lastly, under the heading of defense, we must consider an important factor, the phagocytes themselves. The question of the origin of the antibodies, whether they are derived from the phagocytes, as Metchnikoff holds, or from other sources, as other well-known investigators claim, is entirely outside the scope of this short paper, but whatever view we hold, we must all admit the great importance of the phagocytes themselves. Since the action of the opsonins is intimately bound up with that of the phagocytes, these will be classed here. It may be well to define exactly what opsonins are. The name is from the Greek, and, freely translated, means, "to prepare for eating," or "I prepare for eating." The opsonins are normally present in the blood serum, and, as the name implies, they act on the bacteria in some way, preparing them for ingestion by the phagocytes—that is, they prepare them so that the phagocytes can the more easily eat and digest them. Hence, indirectly, they act by stimulating the phagocytes and hence the placing of these factors together.

Based on the preceding ways in which Nature copes with infection, we have four classes of therapeutic agents, each one differing from the other in the fundamental, underlying principles of application. Those four comprise the antitoxins, vaccines, bactericidal and bacteriolytic serums, and the leucocyte extracts. It is not necessary to deal with the antitoxins,

as their use is well known. The second class, the vaccines, are one of the important subdivisions to be dealt with at some length. By the use of vaccines, either attenuated cultures of the living bacteria or, as is now more often the case, killed cultures, we aim to stimulate the body to increase its formation of antibodies and thus to overcome the infection. When the case is subacute or chronic, a rational and closely watched course of treatment with the vaccine is of almost specific value in some cases.

One point of importance is the kind of vaccine to be used, that is, whether autogenous, that cultivated from the patient, or a stock vaccine. To my mind, there are no two sides to this question, as in all cases it should be an autogenous vaccine, although I have used the stock one in some cases. The vaccine, as explained above, stimulates the formation of antibodies and opsonins, and so far experience seems to show that these antibodies and opsonins are specific—that is, that a certain bacterium will give rise to a certain antibody or a certain opsonin, and that antibody or opsonin will be effectual against that bacterium and against that alone. It is easy to see, then, why we should use an autogenous vaccine. The stock vaccines are made up of mixtures of different strains of bacteria of the same or allied species. If a strain of the particular offending organism is present, we may get results, but if not present, then the specific antibody or the opsonin is not stimulated to formation, and no good results from its use. The system, with a stock vaccine, is called upon to form a whole series of antibodies, corresponding to the varieties introduced, and these have no function to fulfill, as there are no corresponding bacteria to oppose, so that the energy of the system is spent in useless work. This observation applies to all stock vaccines, but especially to vaccines of bacteria such as the staphylococcus and streptococcus. When we consider the multiplicity of forms of such bacteria, it is easy to see why stock vaccines fail in some cases, in which the results with autogenous vaccines have been so brilliant. We are all familiar with the many forms of streptococcus, differing as they do so little in morphology and staining properties, and, what is more important, so much in their pathogenic action. In some work in which I am now engaged, in classi-

ying the various bacteria found in the tonsils, one is at once impressed by the many varieties of streptococcus isolated. When we consider the staphylococcus, the same holds true. We see differences in pathogenicity, pigment formation, liquefaction of gelatin, and their cultural characteristics in general. These are but examples; the list is almost endless. Thus we can understand that in a given case, unless the invading organism forms one of the strains in a stock vaccine, probably no effect is produced. Again, why do we need stock vaccines at all? Needless to say, the microbial cause of a disease must be known before an attempt can be made to treat with a vaccine. If we can get enough of a discharge to make a bacteriologic examination, we can at the same time make cultures and prepare a vaccine. The gonococcus is rather hard to prepare as a vaccine, on account of the fastidiousness of this bacterium, which grows only on special media and quickly dies out. As there are probably few varieties, the results with the stock vaccine have been rather good, but in all cases it is better to use the autogenous one. The stock ones may not be fresh, and this is quite an important point, as, even with autogenous ones, it is better to make new vaccines every few weeks.

This completes the list of cases treated. On the whole, I think the results were very satisfactory. It might here be said that all the ordinary methods of accepted or recognized treatment were used in conjunction with the vaccine treatment. However, in view of the fact that these methods of treatment had been given a thorough and exhaustive trial, in some cases extending over a period of years and in all cases at least for months, before the vaccine was used, the results obtained can be fairly attributed to the vaccine treatment.

## HERPES IRIS OF THE CONJUNCTIVA, WITH REPORT OF A CASE.

BY DR. HANS BARKAN, SAN FRANCISCO, VOLUNTARY ASSISTANT AT  
THE II. UNIVERSITY EYE CLINIC IN VIENNA—PROF. E. FUCHS.

THE first case of herpes iris of the conjunctiva was reported by Fuchs in 1876. Since then cases have been reported by Hanke, Bergmeister, Nettleship, Manz, H. Knapp, Derby, and others, until to-day the reported cases stand at twenty. The clinical picture in all these is a fairly consistent one; the case here reported, besides adding one more to a rather small list, differs essentially from the usual type in its course and end-result.

The patient came to the eye clinic of Professor Fuchs in June, 1912, where I had the opportunity of examining him.

The patient noted the first symptoms of his present disease in March, 1911. Both eyes became somewhat red, with a marked glairy discharge and extreme photophobia. This condition lasted for fourteen days; he then noticed that his teeth were loose, and that his gums bled easily; four to five days after this his throat became sore and inflamed, he had difficulty in swallowing, felt nauseated and feverish, and went to the Charité Hospital in Berlin. His eyes had become constantly worse, being more sensitive to light, and excreting a great quantity of mucoid whitish material. After four weeks in the hospital he was dismissed with a normal temperature, with his mouth, throat, and gums healed, but with his eyes unimproved.

He came to the ambulatory of Professor Fuchs's Eye Clinic in Vienna on June 6, 1912, having suffered for fourteen months with photophobia and a constant conjunctivitis accompanied by profuse, thick, stringy secretion. He was admitted to the ward, and while there had an attack of erythema multiforme, during which he had a high tem-



perature and was at times semi-comatose. The skin was covered with hemorrhagic blebs, the mucous membranes of the lips and oral cavity bleeding from many small ulcerated areas. For a few days he had a bloody urethral discharge, accompanied by severe pain on urination. The eye symptoms, consisting of a virulent conjunctivitis of the diphtheritic type, with great masses of glairy, fibrinous grayish-yellow exudate, increased constantly, the process finally leading to superficial ulceration of both corneæ.

He stated upon recovery that he had been at the Charité in Berlin a year ago with a similar but somewhat milder attack, and that his eyes had always been normal before.

Enquiry at the Charité elicited that he had been admitted the year before with the diagnosis of herpes iris of the skin and mucous membranes, his eyes at that time showing a violent conjunctivitis, but no signs of any previous inflammation.

After a stay of several months at our clinic he left the hospital with the discharge and photophobia unabated, and due to his practically blind condition entered the almshouse. At that time the condition of his eyes was as follows: the lids, rather red and marked with dilated veins, the result of constant blepharospasm, are contracted spasmodically on exposure to ordinary light; the cilia are glued together by a tenacious, white mucous secretion; the right eye shows an ankyloblepharon measuring 3mm from the external canthus inward. Nasally a strand of tough connective tissue extends from the outer margin of the upper lid to that of the lower, entirely covering the region of the caruncle. The palpebral conjunctiva is pitted with many small yellowish-white scars, between which the mucous membrane is reddened and of a hypertrophied follicular character. Both lids are somewhat shortened by the contraction of the scar tissue. The inner surface of the nasal portion of the upper lid is attached to the adjacent bulbar conjunctiva by a few fine adhesions of elastic consistence and gray color. The eye itself shows a marked ciliary and conjunctival injection. A disk-shaped gray opacity 2mm in diameter, denser in its center than at the periphery, occupies the center of the cornea. A few deep and superficial vessels extend from the limbus to the margins of the opacity. The anterior chamber is normal, the pupil well dilated by atropin, the iris somewhat discolored. The left eye shows nearly the same picture: a temporal ankyloblepharon, a nasal symblepharotic membrane, great quantities of grayish-yellow stringy secretion. Several connective-tissue strands stretch from both the temporal and nasal portions of the conjunctiva of the lower

lid to the adjacent bulbar conjunctiva. The palpebral conjunctiva itself is of the same scarred character as that of the right eye. The cornea shows a central macula, somewhat larger but less dense than that of the right eye.

Deep and superficial vessels, going to the central opacity, lie especially in the outer and lower quadrant of the cornea. The anterior chamber, iris, and pupil correspond with those of the right eye. The fundi were not examined because of the intense photophobia. The vision of the right eye was fingers in 2.5*m*; that of the left, fingers in 5*m*.

A number of skin diseases, such as leprosy, small-pox, pemphigus, eczema, and herpes zoster, may seriously affect the eye. Erythema exsudativum, especially its rather rare forms, herpes iris and herpes circinatus, does so rarely; when so, the clinical picture of the eye disease is, as a rule, a rather mild and somewhat characteristic form of catarrhal conjunctivitis; it varies from the ordinary catarrhal conjunctivitis in that the lids are normal, or at the most very slightly reddened and oedematous, the cilia and lid-edges normal, the conjunctiva, only slightly reddened, the conjunctiva of the retrotarsal folds only slightly injected, but at the same time oedematous, with a glassy shining appearance and covered by an increased watery secretion, which rarely is of a mucoid character. Photophobia and pain, except for a slight amount of smarting sensation, are absent. The cornea and iris are not involved; the disease pursues a somewhat chronic course but leads to complete recovery. It thus differs from an acute ophthalmia by its absence of strong subjective symptoms, of marked injection or oedema of the bulbar conjunctiva, of profuse mucoid or purulent exudate, and by the presence of a striking oedema of the retrotarsal conjunctival folds. This, however, applies only to the ordinary mild form; there is a severe type, likely to be associated with lesions of the mucous membranes of the mouth and larynx and even of the vulvo-vaginal and urethral mucosa—this last occurring in my case—the so-called “malignant” form of Levin, the “ominous” form of Uffelman—its course marked by a high temperature and occasionally ending in death.

There is again a form affecting the mucous membranes only, and recurring for years in periodic efflorescences on these membranes. In this severe form, be the general picture one

of mucous membrane involvement only, or of skin and mucous membranes, cases of eye involvement have been reported in which the picture was that of a membranous conjunctivitis—thick exudates on the tarsal conjunctiva and in the sulcus subtarsalis, with participation of the conjunctiva bulbi, and extension of the inflammatory process to the cornea, even to ulceration. The first case, reported by Fuchs, belonged to this group. Neumann, Bergmeister, and Hanke have reported cases of this kind, all showing coincident lesions of the mucous membranes of the mouth, as well as the typical skin eruption. In Hanke's case, which pursued a fatal course, both corneæ were destroyed, one by superficial ulceration, one by perforation. I have had the opportunity of examining the specimens of this case, the microscopic pathology of which, fully described by Hanke, may be summarized as follows: the surface of the lid is formed by a layer of hyaline material derived from granulation tissue; the epithelium has been cast off, the tissue below containing many very fine thin-walled vessels and densely infiltrated with leucocytes; it is made up of young connective tissue with spindle cells and large oval cells with pale nuclei; some of the vessels are filled with hyaline thrombi, and extensive necrosis of the subepithelial tissue has occurred. It is the picture of a severe membranous exudate, and does not differ in any way from that caused by a number of other well-known etiological factors.

In the case reported, the stubborn lesion affected the conjunctiva, while the lesions of the skin and mucous membranes were at all times less marked and healed completely. The bloody urine was no doubt due to lesions of the urethral mucosa. In the severity of its course both during the acute stage—photophobia, violent ciliary and conjunctival injection, great quantities of fibrinous exudate, and finally corneal ulceration—as well as in its final result—ankyloblepharon, symblepharon, corneal maculæ, with photophobia and secretion of glairy mucus persisting a year after the initial attack—the case reported affords a picture of ocular involvement in connection with herpes iris very rarely found to such a degree. Indeed, any involvement of the eye in connection with herpes iris is a rarity.

It is a pleasant duty to thank Hofrath E. Fuchs for the

interest he has taken in connection with my study of this case.

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## ANOTHER VIEW OF THE EXTRACTION IN THE CAPSULE CATARACT OPERATION.<sup>1</sup>

By C. B. MEDING, M.D., NEW YORK.

**T**HAT we may start on common ground it will be in order to recount the definite reasons which took me to India to study the Indian cataract operation under Colonel Henry Smith, formerly of Jullundur, and now of Amritsar, India—reasons which to my practical satisfaction had not been met here or in Europe.

My work in the Harlem Eye and Ear Infirmary had brought to me, as similar work must bring to all, the crying need for relief from immature cataract. You are all quite aware of the verbal claims for perfectly satisfactory methods of dealing therewith—quite aware too of reports in various printings offering about one hundred per cent successes in unripe cataract removal.

We have not been amiss in following the reported work of American, English, and Continental institutions and have visited many of them, but as working members of the profession in New York we know the method in common use, and it has been my own—a system of "Come again in two months"; a system that increases the number of reported cataracts in New York City to an unknown degree by duplication; these "Come again" patients frequently possessing a complete eye hospital directory on their visiting list.

The results are disastrous. A working man over fifty, afflicted with beginning cataract, can be and most often is ruined financially and socially through the disablement that commonly lasts three to six years, more or less. Savings are

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<sup>1</sup> Read before the Ophthalmological Section of the Academy of Medicine, February 17, 1913.

exhausted, homes bankrupt, ambition paralyzed, happiness wrecked, and when at last the ripened cataract is operable, the operator has at hand all the best physical and mental conditions for untoward results; too often the other eye is on its "milky way," and at best we discharge a one-eyed man into the field where age alone is sufficient handicap. If to your mind I have overdrawn the picture, to my own and to that of those who have worked at my side, not a single detail is exaggerated. Perhaps your position in larger institutions prevents intimate acquaintance with the human element. Increased work under my personal touch simply multiplies earlier experiences.

If there are men who, outside of discussion, regularly operate the immature cataract of the poor on sight and are delightedly content with their results, I do not know them and regret my ignorance.

My second reason was dissatisfaction with the cataract operation as I knew and practised it. First, because of my own results, secondly, from results obtained by others and constantly inspected in the course of refractive work in public and private; results that naturally follow an unsurgical procedure. Is it not an unsurgical procedure to leave a foreign body in the wound? The capsular operation always leaves behind under complex conditions an obstructing remnant, the capsule, and too often more or less lens substance.

As yet every suggestion made to eliminate these offenses, such as removal of anterior capsule and irrigation or suction for cortical remains, leaves at best a posterior capsule that may and does wrinkle, dislocate, or whiten, and an unfortunate frequency of some degree of ciliary or iritic irritation with its more or less serious consequences.

Again, we all have the drug habit, more or less, and atropin or eserine in some form before or after is in common use. Uncertainty prompts early and frequent dressings and a great deal of indecision as to time of confinement is prevalent.

As a finished product there is too often a white veil in sight, through a hole in which the vision is accomplished, and this artificial pupil is in a large number of cases the product of one or more operations. For the rest we have examples of results possible to all operations on the globe: scars, variously key-

holed, fixed, or distorted pupils, and visual results largely dependent thereon.

The cosmetic discussion is always pre-operative. Post-operative cosmetic conditions are forgotten in the quest for vision.

To sum up with E. Treacher Collins, difficulties due to retained lens substance, wrinkling capsule, new growth of cells lining anterior capsule, and adventitious fibrous tissue are real and constant dangers of capsular operations.

It would be unfortunate if my message should kindle any feeling other than that of interest and desire for progress, or see in my position any bias. What I can do, any one can do. You may not be so ready to admit the claim, that my best work is not very far below the best average, so I should not have a majority of all the unsatisfactory results.

I knew the Henry Smith or Indian operation by repute; I saw it performed by Doctor D. W. Greene at Dayton, Ohio, and did one operation under his tutelage. To him I owe the inspiration and opportunity for Indian study. I had compared its supposed demerits, loss of vitreous, and drawn-up pupil with the same accidents in capsular work. I went carefully over the cataract statistics to be found in Knapp's ARCHIVES over a period of twenty-eight years, drawing up a sort of giant table of statistics which included institutional reports. There was more pain than profit in the task and the usual discovery of an impossible nomenclature—but one thing was certain: in the figures hall-marked by consistency and an intelligent terminology, the capsular held no advantage. On the other hand, the claims of the intracapsular in uninterrupted recovery, visual and cosmetic result, were tremendous. I could learn nothing further here. Those who had been to India were for the intracapsular, those who spoke against it prefaced their remarks with acknowledgments that vitiated the context. Doctor Greene then secured for me an invitation from Colonel Smith. I sailed August 27, 1912, reached Amritsar, September 30th, and worked in company with Doctor Dorland Smith of Bridgeport, Connecticut.

Doctor Smith and I operated alternately, visited, and dressed our own and each other's cases, noted the conditions,

and learned to respect them. We discharged our own cases, assisted each other, and were watched and guided throughout by our host. We were not hero-worshippers when we went, but we return, figuratively, on our knees. You will be glad to know that we met a man, physically, mentally, and morally. He took us in, fathered us, made his home ours, gave us instruments, patients, tuition, the free run of his hospital of over three hundred beds, and every opportunity for criticism, discussion, and investigation. The price of it all was that we bend our efforts to achieve. In no profession will be found bigger, better manhood than this.

There is for me then to give you the answer I received in India, some salient conclusions, and to affirm my satisfaction with the result.

You have all read of the operation, have possibly seen it performed, and no doubt some have performed it accidentally. No description I could give could be more correct or detailed than that given by previous students, *i.e.*, Doctors Greene, Vail, Bentley, and others, or more sufficient than that in Colonel Smith's book, of which there should be a new edition. Its conspicuous differing points are the method of and means for expressing the lens in its capsule, and the assistant and his duties. The difficulty is inspiring, not prohibitive, but, as is the case generally, descriptions do not teach.

The main and apparently forbidding difficulty of the operation is the factor of pressure. Most operators have no experience beyond that which expresses lens substance or causes accident. But these forces have little in common with the scientific "push, pull, and hold" which make up the Smithian maneuver. The pressure necessary to express lens substance does not demand "thinking fingers." To express the lens in its capsule does require just that.

Pressure as it is taught at Amritsar is positive, controlled, and safe, and under good tuition can be learned.

The necessity of a competent assistant is admitted. The operation is impossible without.

The bugbear of vitreous prolapse hangs over us to such an extent that few are brave enough to relate their actual experience. Large experience, however, gives an operator rest from argument.



Colonel Smith at once impressed me with his good sense, freedom from cant, and open-mindedness. He gave no talk on instruments. He uses his own speculum, lid and lens hooks, the simplest scissors, forceps, and iris repositor, and any knife that has a spear point, sharp blade, and will fill its own wound. You learn quickly that neither instrument, light, antiseptic, patient, nor flourish make or mar a good operator. In Amritsar, talk, arrangements, nurses, orderlies, paraphernalia, and bottles disappear. You stand with clean hands, sterile instruments, and a pair of clean eyes that have come from no one knows where directly to the table, and do your work, and for failure the master says simply, "You will learn," thus placing mistake, accident, and ignorance where they belong—on you.

He is particular as to the holding and using of instruments, insisting on finger rather than on wrist or arm motion. It is, however, insistence on the correct mechanical principle.

Every eye is operated that has a chance. Glaucomatous and trachomatous, hazy and pannused corneæ and leucomas, as they come, one or both, you operate. A goodly smear of yellow ointment is applied to the lids, a simple bandage covers both eyes, and the patient is carried to bed. Barring accident the bandage is removed on the tenth day; if eyes are healed and quiet a green shade is provided and the patient is discharged. Iritis in any degree whatsoever is almost unknown and pain, only in iris prolapse or hemorrhage.

Results are startling. We found what we sought: one operation, a clear pupil, a vision to enable men to earn their living at their usual avocation—student, artisan, or laborer; the immature the easiest, the hypermature the more difficult. We have no panacea, but to a large extent we have superseded the method of "atropine and hope." I withhold the detail of my operative experience in India, because it is that of a beginner. It could not legitimately be used as evidence, except to the convinced.

Of the operation I have briefly this to say:

It is original! It is manifestly unfair for Herbert to say it merely eliminates detail and has no claim to originality. A wise evolution of detail is its very soul.

The section is one sweep of the knife and within the cornea—adapted for least contusion and rapid healing.

The method of seizing iris for iridectomy is original, obviates introduction of forceps beneath cornea and prevents injury to capsule.

The lens expression and instruments are original, and denial or neglect of Smith's method of force and direction is the cause of failure and fear.

Replacement of iris, while the upper lid is held forward, brow retracted, and lower lid fixed, is absolutely new and reduces manipulation to a minimum—a splendid method in any operation.

Smith's preparation of the field, douching with 1:2000 bichloride, has back of it the experience of all India, and needs but a trial to displace any other. While it omits rubbing, squeezing, and everting, it opens the sac to its widest, floods, flushes, and cleans it—in a word does all that can be done. We must beware of using the non-achievable as a test for the method that accomplishes the possible with speed, ease, and certainty.

Smith's speed is, from my point of view, another originality. Thirty cataracts in an hour is a departure and prolific of good. It is not hurry, but the elimination of waiting time, standing time, talking time, forgetting time, and nonsense. It is the concentration of skill and energy on the operation instead of on a multitude of befogging, stereotyped maneuvers.

I come to you then as a disciple of a man who is trying to do an old thing in a new and splendid way. He is so brilliant an operator, his technique is so faultless, his courage and experience so unrivaled, that one might easily credit him rather than the operation with the results, but his teaching prompts me to hold that the operation not only makes good, but that it can be learned as well as the capsular; that if men beginning their career or still possessed of sufficient youth to spurn difficulty will use the same means to accomplish the intracapsular as they must use to perform the capsular, they will succeed as well operatively and better thereafter. The material is certainly as plentiful for one as for the other.

Out of an infinity of labor have come the method, the instruments, the courage, and the results. Only out of labor can

come the inheritors thereof. If it be questioned whether, with so excellent a method at hand, we are justified in postponing until ripened the hundreds of immature cataracts that are crippling and impoverishing our fellow man, I must answer and practise a decided "No!"

## CONTRIBUTION TO THE PATHOLOGY OF HEMORRHAGIC GLAUCOMA.

BY DR. J. STÄHLI, OF ZÜRICH, SWITZERLAND.

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(With two illustrations on Plate IX. of the German Edition and two figures in the text.)

**I**N the microscopic examination of a large number of cases, presenting the clinical picture of hemorrhagic glaucoma, marked changes were found in the vessels. These changes have led to the recognition of hemorrhagic glaucoma as a separate disease from glaucoma.

I have had the opportunity of examining three cases of hemorrhagic glaucoma, which all present typical vascular changes. The eyes, in every case had finally to be removed on account of the increased intraocular pressure. In all three cases there were hemorrhages in the retina, and in one, hemorrhages were also found in the optic nerve. The specimens were fixed in formalin, hardened in alcohol, and imbedded in paraffin. The optic nerve was cut in sections, at right angles to the optical axis. The sections were cut in series, with No. 1 being the section most removed from the eyeball. The eyeball was divided equatorially. Antero-posterior sections were made of the anterior and posterior halves. The segment, which included the area of the head of the optic nerve, was also cut in series. Only a few sections were stained from the remaining parts of the posterior half of the eyeball and of the anterior half. The stains employed were either hæmatoxylin-eosin and Weigert-picrocarmin. Some of the sections were stained according to van Gieson.



CASE I.—J. J., 63 years of age, had noticed a diminution in the sight of the right eye for some months. At the examination, glaucoma was present, which did not respond to pilocarpine. Finally, the eye became painful, and had to be removed under local anæsthesia.

Microscopic Examination: The optic nerve measured 5mm, and was divided into 45 serial sections, of 15 $\mu$  thickness.

a. Central artery. The central vessels are found in the axis of the nerve. In the first 30 sections, the endothelial tube is separated, and is situated curled together in the lumen of the vessel. I consider this to be a post-mortem condition. From section 33 on, the intima is in its normal position. In the accompanying figure, the variations in the lumen of the vessel are easily followed. The outer cylinder, with oblique lines, represents the muscular coat and the adventitia. The nearly black cylinder represents that part of the artery wall which lies within the elastica interna. The adventitia presents nothing noteworthy. The muscular coat is well formed; it contains some intensely stained muscular nuclei and wavy elastic fibers. The thickness of the muscular coat in section 1 is 30 to 33 $\mu$ . Nearer to the eyeball the muscular coat becomes narrowed and atrophic. The intima presents the greatest changes. Beginning at section 78, the lumen gradually becomes smaller, to reach its thinnest part in section 122. The lumen then dilates irregularly, to become constricted between sections 250 to 269. The greatest thickening of the intima varies from at first being nasal, then nasal and below, then below and temporal. In the region of the lamina cribrosa where, as a rule, the vessels show the greatest constriction, the arterial lumen is practically not affected. As long as the thickening of the intima remains moderate and one-sided, the changes are those usually found in endarteritic vessels. Within the elastica interna there are two or three elastic bands which are in places



Fig. 1.

swollen. The spaces between the elastic lamina are filled with a loose tissue, containing cells which are swollen. In the parts of the artery which are nearer to the eyeball, and where the constriction of the lumen is marked, the intima presents a different picture (see Fig. 1, Plate IX.). The elastic fibers are separated by broad bands containing vacuolated tissue, with only a few cells. This is a true cellular hydrops. The cells which are centrally placed to the innermost elastic band apparently did not participate in this oedematous condition, and the nuclei are fairly well preserved.

*b.* Central vein. This vessel also shows a number of pathological changes. In the first 150 sections, well-marked sclerosis is visible (see Fig. 2, Plate IX.). The venous wall has a width of  $50\mu$ . It is very much thickened. It is formed of a striated tissue which colors red with van Gieson stain, and resembles the dural sheath of the optic nerve. The endothelial layer is intact. The venous wall is surrounded externally by a crown of elastic fibers, which are thinner in the vein than in the artery. They are, however, more numerous and more striated. The tissue of the venous wall is in general poor in nuclei. In many places, there is small-celled infiltration in the wall. In the course of the vein, represented by sections 1 to 268, there are 31 branches of varying size, which enter the central vein. In the last 77 sections there is not a single branch, notwithstanding that the vein and its lumen were growing thinner. In section 331 the artery has a wall of  $45\mu$ , a lumen of  $125\mu$ . The central vein at this point shows a lumen of only 50 to  $55\mu$ . This thinning of the vein as it approaches the eyeball may be explained in two ways: It is either the result of the retinal atrophy, or it may have been an old condition. The neuroglia elements in the optic nerve are unusually thickened. There are some small perivascular foci of inflammation, small vessels filled with blood and surrounded by a small-celled infiltration. There are numerous hemorrhages which increase in number as they approach the lamina cribrosa. The blood-vessels do not show any distinct sclerosis to account for these hemorrhages. It is remarkable how little the nerve fibers have suffered from their presence. The optic nerve within the eyeball shows a deep marginal glaucomatous cup. The retina is atrophic, especially in its inner layers, so that the framework of Müller's fibers is unusually distinct. There are large cavities which probably contained an albuminous serum. There are large cavities to be found between the two nuclear layers. The rods and cones are placed obliquely or bent. There are only a very few fresh hemorrhages in the retina.

The vessels present a slight change in their walls. The choroid is thin, without pronounced vessel change, and there are no inflammatory infiltrations. The ciliary body is atrophic, the vessels of the iris and of the ciliary body are also practically normal. The angle of the anterior chamber is obliterated.

CASE II.—M. B., 61 years of age, was seen on account of loss of vision, and many hemorrhages were found over the retina. The veins are not particularly congested; the large branches of the artery are somewhat narrowed. White areas of degeneration appeared about the disk. About six weeks later the eye became hard and painful, which was not relieved, and an enucleation was performed.

Microscopic Examination:

a. Optic nerve. The series of optic sections consists of 504 of  $10\mu$  thickness.

1. Central vessels.

a. Central artery. The muscular coat was somewhat smaller than in the preceding case. The intima is thickened in sections 91 to 345. This thickening reaches its greatest extent in sections 193 to 240. The constriction of the lumen is only a moderate one. In section 239, the lumen measures  $135\mu$ . The thickening of the intima resembles that observed in the first 80 sections of Case I. The endothelial layer is intact. There are no hydropic cells. From section 290 on, the thickening of the intima becomes less, and is not recognizable in section 345. At the same time, the intima does not become normal. Between the elastica interna and the endothelium there is a hyaline layer, which becomes thicker as it approaches the eyeball. In section 409, it measures  $6\mu$ .

b. The central vein. In section 45 and in the next 200 sections, the vein is normal. In sections 247 to 290 there is a moderate round-celled infiltration in the part of the vein next to the artery. From 364, the venous wall resembles Case I., without attaining the same degree of sclerosis. A curious condition is found in the central vein as it approaches the eyeball. A thin septum appears which divides the lumen of the vessel. Then another division takes place and the vein is divided into three lumina, so that there are three vessels of about the same walls, each with its own endothelial lining. The vascular wall is formed by the two layers of thin flat cells. There are no inflammatory signs. A number of small branches are given off, and they rapidly lose in caliber. One ceases in section 461, and one of the others is contracted to the size of a capillary. From section 470 on, the vein suddenly



dilates. This is probably due to the congestion in the eyeball. It seems likely that this division of the central vein into three parts was probably due to congenital changes which made the condition more serious with the onset of endophlebitic changes. The optic nerve presents nothing of importance beyond the increase in the neuroglia and a dissection of the connective-tissue septa. There are a few perivascular inflammatory foci. These are usually situated in the periphery, directly about the blood-vessels, near the pia. The number of small optic nerve vessels is perhaps increased. The eyeball has a deeply excavated disk. The floor of the excavation is infiltrated with inflammatory products. All layers of the retina are atrophic. The layer of rods and cones presents vacuoles and a bending of the parts. In all layers there are extensive hemorrhages, a diffuse infiltration with blood of the inner and the outer layers of the retina. In addition, there are gaps in the tissue, the results of transudation. The retina is distinctly oedematous. There are a number of hyaline round bodies, which, to my mind, represent the white areas of degeneration. The retinal vessels show practically no changes in the large-sized branches. The smaller and smallest branches are sclerosed. The choroid is thickened, the vessels are degenerated, with thickened walls. The ciliary body is atrophic, the vessels of the iris are thickened, the angle of the anterior chamber is obliterated.

CASE III.—F. H., 76 years of age, has suffered from loss of sight in the left eye for two years. The eye has occasionally been red, and there have been prodromal glaucomatous attacks. The eye is glaucomatous. After sclerotomy the tension remains elevated. On account of the pain, enucleation is performed. A few hours after the operation the patient goes into collapse and dies. At autopsy there is atheroma of the aorta, marked sclerosis of the coronary vessels.

Microscopic Examination: The 3mm long optic nerve is divided into 265 sections, of 10 $\mu$  thickness. The central vessels run in the axial connective-tissue strand. The artery does not give out any branches. The vein receives numerous branches of varying size. Both vessels are small, not only as to the thickness of the wall, but also as regards the lumen. The lumen of the artery in section 1 has the greatest diameter of 75 $\mu$ , the vein of 100 $\mu$ . In the other eye, which was also examined, the lumina measured, in a corresponding position, 190 and 200 $\mu$ . This poor development of the central vessels seems to be the result of an atrophy associated with a secondary degeneration of all



the nerve fibers of the optic nerve. As this case came to autopsy, the right eye could also be examined. The optic nerve showed but few vascular changes. The retinal and choroidal vessels were moderately sclerosed. There was no glaucomatous cupping. There were no hemorrhages in the retina or in the optic nerve.

*a.* Central artery. The muscular coat and the adventitia are normal. The intima shows pathological changes, which are elucidated in Figure 2. In section 1, the intima is as broad as the muscular coat. The thickening of the intima is uniform. To the inner side of the elastica interna there is a loose tissue, with few nuclei, which contain a number of wavy, elastic fibers. Internal to this, there is a broad hyaline layer, and a well-preserved endothelium. In the next 170 sections, conditions are presented which resemble this section. Beginning at section 174, the thickening of the intima suddenly increases. In section 176, the lumen now measures only  $35\mu$ . This remains constant for a few sections, and is then suddenly dilated nearly to the normal; then at section 192 another constriction appears which continues until section 211. From then on the thickening of the intima is only moderate. In the points of greatest constriction the intima shows the same changes as is seen in section 80 of Case I. In other words, the lumen is mostly taken up with a tissue composed of hydropic, swollen walls. To the inner side there is a normal endothelial layer. In the vacuoles the nucleus can frequently be seen and also Altmann's granula. There is no hyaline layer.

*b.* Central vein. The vein presents the same picture of marked sclerosis as the vein in Case I., except that the changes are even more marked. There are no inflammatory infiltrations. The most marked change in the optic nerve of this case is the complete disappearance of all nerve fibers. The well-known connective-tissue septa contain delicate fibers and numerous neuroglia cells, but there are no nerve fibers.



Fig. 2

Recent investigations have shown that in these cases of

glaucomatous optic nerve atrophy, an ascending degeneration is present, and that the condition is not due to a neuritic atrophy, though in this case it is remarkable that the retina is not atrophic in proportion to the complete absence of the nerve fibers in the optic nerve. Furthermore, there are distinct signs of an inflammatory process in the optic nerve. There are no hemorrhages. The disk is deeply cupped, the retinal vessels are at first narrow, and the arteries and the veins are both sclerosed, though this is not as marked in the larger vessels as in the smaller ones. The vessels of the 3d and 4th order are enormously thickened. A detailed description of these remarkable vascular changes are found in Reimar's article on "Hemorrhagic Retinitis Following Proliferative Endarteritis." The retina is covered with recent hemorrhages. Most of them are situated in the inner retinal layers. There are also extensive subretinal hemorrhages. There are no other characteristic changes beyond the usual cavities in the space between the nuclear layers. The choroid is thin, the vessels are moderately sclerosed.

*Conclusions:* In each case changes were found in the central artery as well as in the central vein.

The intima thickening was most pronounced in Case I.

In Cases I. and III. the endarteritic thickening was due to the swelling and hydropic condition of the intima cells. This oedema cannot be without importance.

It seems likely that acute, especially transitory conditions of occlusion of a vessel may be brought about by such changes.

The central vein shows marked sclerosis in Cases I. and III.

A curious change is presented by the vein in Case II., namely, a division of the lumen into three parts, with cessation of two. This is probably a congenital condition, which was of importance as soon as the circulation became disturbed.

In all the vessels the endothelial layer is intact. This explains that no thromboses occurred.

The retinal vessels show in all cases more or less sclerosis.

Vascular changes are also found in the choroid, iris, and ciliary body; also, in Case II. about the posterior ciliary artery.

There are no ruptures of the vessel wall to be found.

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## THE PATHOGENESIS AND THERAPY OF FACIAL ECZEMA IN CHILDREN (FROM THE STAND- POINT OF THE PEDIATRIST).

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Translated by Dr. ALFRED BRAUN, New York, from *Arch. f. Augenh'lk.*,  
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FACIAL eczema in children is combined, principally after the first year of life, with affections of the eyes, and consequently it might be proper to discuss here, only the skin affections which occur after the first year, and not to consider those which occur in infants, at all. However, it is not the purpose of this article to describe to the oculist a picture which is perfectly familiar to him. I wish to show that, according to our present views, the disease is a manifestation of a constitutional anomaly, which begins during the first month of life, and is evident in different forms under varying influences in the course of the first few years. Thus it is necessary, as Czerny, the exponent of the new teaching has done, to go back to the earliest signs, in the description of the fundamental constitutional anomaly.

It is well known that pediatrics is almost the only branch of medicine which has never entirely abandoned the old diathesis theory. Especially such skin-affections of children could not be understood as local diseases, and always compelled anew to the acceptance of a particular dyscrasia. Thus it is easy to understand how the conception "scrofula," in spite of the most varied definitions, which were given to it, would never disappear from the literature and practice. From the profound need of a more accurate determination of this constitutional weakness is understood the success which Comby's



teaching of arthritism found. He combined under this heading a large number of related skin and mucous membrane affections as dependent upon a gouty diathesis. In short articles in the *Monatsschrift für Kinderheilkunde*, Czerny founded his theory of the exudative diathesis, which, in a short while, received universal recognition.

One of the most important manifestations of this constitutional weakness is facial eczema. Its significance and its manifestations can only be understood and described from this viewpoint.

The exudative diathesis manifests itself by the disposition to chronic and relapsing inflammations in the skin and mucous membranes.

It is congenital and disappears, although not always completely, during youth.

Its intensity is dependent upon the character of the nourishment in such wise that a manifestation of equal intensity can be aroused by a primary marked predisposition without decided errors in nutrition, as in cases of mild congenital predisposition, with grossly unsuitable nutrition. Besides the nourishment, measles and tuberculosis can cause a diathesis which has almost disappeared, to reawaken.

The significance of the new teaching can be made most intelligible, if we consider how the diathesis manifests itself on the skin and mucous membranes, in the first weeks of life. We find, in a one-month-old infant, the head covered with sebaceous scales. Even with careful nursing, the nates show an intertrigo, and we often see that the intertriginous spot has an irritating effect upon the surrounding skin, which shows small eczematous papules, gradually diminishing in the more distant parts. We also see a slight nasal obstruction resulting from a coryza, and almost always, after the first coryza, a swelling of the cervical glands. This includes all the characteristics of the exudative diathesis; viz., excessive reaction to a skin irritation, a spreading of this irritation in the form of an eczema over the rest of the body, a tendency to affections of the mucous membranes, and swelling of the regional lymph glands. I do not wish to enter upon the frequent coincident symptoms in the gastro-intestinal tract.

On the ground of these findings, we can prognosticate the

dangers which are likely to threaten the child in later life, and we can prevent them by proper nourishment and nursing.

The manifestations in the skin change with advancing age. In the first weeks and months, intertrigo and seborrhœal eczema of the head form the basis upon which the disturbances develop. The intertrigo can involve all the skin-folds. From these regions, eczematous papules or spots which somewhat resemble luetic papules may spread over half the body. From this condition, it is but a step to a general dermatitis with all its dangers. The scalp is easily irritated by attempting to remove the scales, and there follows a moist eczema, with thick fatty crusts. When these crusts are removed, the hair comes with them. But even without a marked dermatitis, the hairs can be pulled out very easily. In the course of the first quarter of a year, there occurs, frequently, a slight redness of the cheeks. Then an eczema appears in this region, which may spread over the cheek and forehead. This eczema never involves the eyelids, the skin of the nose, the upper lip, nor the region about the mouth. The form in which the eruption occurs is very varied. It may be very moist, with a tendency to become covered with crusts. This form usually occurs with a good nutritional condition of the child. In other cases, the eruption consists of a dry, red, inflamed skin, which tears easily. This form occurs in thin, poorly nourished children. It also occurs when a previously healthy child gets pneumonia, meningitis, or severe gastro-intestinal disturbance. When this form occurs in well-nourished children, it indicates a desired therapeutic result.

But even independently of nourishment, and the physical condition of the child, the eruption shows marked variations in its intensity. This characteristic easily leads to erroneous conclusions in regard to the results of therapeutic intervention.

A large number of the children have very little itching. They scratch very little or not at all, and sleep well. But in some children, the itching is very intense. They have no rest. The scratching aggravates the exudation. The itching often precedes the aggravation of the eruption, and persists after the skin condition has gotten well. The exudative diathesis is intensified by a nervous predisposition, and *vice*

*versa*, the symptoms produced by the exudative diathesis increase the irritability of the child.

Outside of the nervous effects, the facial eczema, when it is transformed, through scratching, into a purulent surface, and also the diffuse intertriginous eczema endanger the child's life. In the latter affection, we often see, when the entire body is covered with ointment and bandages, a temperature-rise, diarrhoea, and loss of flesh, which indicate the seriousness of the situation. The child can be saved, if we change immediately to the open treatment. Less frequently, we see similar symptoms occur, when a purulent eczema of the face or scalp is vigorously freed of its crusts, or covered by an impermeable dressing. Death may occur, sometimes ushered in by high temperature. The blood appears to leave the skin, so that the eruption seems to have disappeared. Death often occurs with slowing of the pulse and convulsions. These may be cases of sepsis. Feer has often found staphylococci in the urine of eczematous children. But we cannot assume this to be the cause in every case. Other forms of sudden death may occur in children with eczema—for example, spasmophilia. The most common cause assigned is status lymphaticus. We find, in these cases, a large thymus, enlarged Peyer's patches, and mesenteric glands. But this is found in almost every case which dies within a few days of the onset of an infectious disease, so that this finding is not so very significant. Of more importance is a hypoplasia of the adrenals.

From the middle of the second year, most of the facial eczemas tend to spontaneous healing. In the meantime, other manifestations have appeared on the skin of the remaining portions of the body; viz., prurigo or strophulus, or chronic papular eczema. In children who had no previous facial eczema there often occur, in the second and third years of life, slightly reddened scaly spots on the face, one-half to three-fourths of an inch in diameter. Sore spots behind the ears, and at the corners of the mouth, and intertriginous eczema in the wrist, elbow, and knee-joints are common. In this period belong, also, the lid-eczemas.

But outside of these various eruptions, the skin of these children shows a specific irritability. The slightest irritation of a secretion suffices to arouse an eczematous eruption, not



only on the moistened spot, but also on neighboring portions of the skin. Thus a compress about the neck may even in a three- or four-year-old child, cause an eruption to appear on the neck and chest. In infants the tendency is so marked that the greatest care must be taken in using moist compresses on the neck or eyes. Manifestations of the exudative diathesis may be aroused by the von Pirquet reaction or tuberculin injection. This does not indicate their tuberculous nature. The sensitiveness of the skin is shown when the children are brought to a neighborhood where the wash-water is very hard. The same sensitiveness exists toward salves.

Of all the skin and mucous membrane surfaces, the conjunctivæ and lids are least often affected. Even in diffuse dermatitis, involvement of the skin of the eyelids is rare. Between the second and fourth years, diseases of the lids and phlyctenular kerato-conjunctivitis become common. This is part of the picture, which we have for a long time called *scrofula*. It occurs usually combined with a characteristic swollen condition of the nose and upper lip. The condition usually occurs in tuberculous patients, but it is neither of a tuberculous nature itself, nor has it any connection with the spread of the tuberculous infection. Pfaundler's hypothesis, that the nasal secretion contains tuberculin-like products which give rise to a sort of allergic reaction in the skin, is undoubtedly incorrect. We have unquestionably to deal with a hypersensitiveness to external irritation, and experience teaches us that uncleanness plays a very important rôle. The pediatricist sees mild forms of this symptom-complex as follows: a running nose, sores about the nares and upper lip, a moustache-like extension of the irritation to the neighboring portions of the cheeks, and inflamed eyes. This picture follows every prolonged coryza, following the wiping of the child's nose by the mother's handkerchief. The nose is first wiped and then the eyes, with the same handkerchief. This habit explains only the location and not the intensity of the irritation. The tendency to marked tissue-swelling is not uncommon in the exudative diathesis. We often see acute swellings, in young infants along the side of the neck, following infections in the naso-pharynx, which are sometimes so severe as to make one suspect phlegmon. In twelve hours, it may



have disappeared. We also see passing œdemas, mostly in the eye region. In severe diffuse intertriginous dermatitis, we sometimes see œdematous swelling of the subcutaneous areolar tissue of the extremities. We must consider that the scrofulous face is a manifestation of the exudative diathesis in a tuberculous individual. Czerny has proven that it is really an exudative diathesis, by curing the scrofula in tuberculous children by treatment of the diathesis.

Very rarely do we see similar manifestations in non-tuberculous individuals. The term eczematous disease of the eyes seems a more suitable term than phlyctenular keratoconjunctivitis.

This is not the place to discuss the remaining manifestations of the exudative diathesis. I will merely mention that all the mucous membranes are involved. The geographic tongue is specific. The chronic relapsing course of the disease and the marked involvement of the regional lymph glands are characteristic of the exudative diathesis. In infants with disease of the nose or naso-pharynx, there is swelling of the glands in the neck. At the end of the first year, the meso-pharynx and pharyngeal tonsils gain in importance. Finally there is hypertrophy of the entire lymphatic ring. From the first days, the deeper respiratory passages may become involved and endanger the life of the child. Spastic bronchitis belongs here; such a case was seen by the writer in a three weeks' old child. The mucosa of the gastro-intestinal tract also shows disturbances.

During severe manifestations of the exudative diathesis, eosinophilia is seen in the blood. An increase in the eosinophile cells is also seen in the inflammatory exudates of these children.

Thus the life of these children consists of a chain of minor and major complaints. The more often they are attacked by small infections, the more unlikely are they to thrive.

Most of the children who are brought to the physician show the stigmata of this diathesis. For the small ailments of everyday life, when they run a normal course, do not require the aid of the physician. But all these symptoms are modified by the neuropathy, which results from the exudative diathesis.

Czerny's theory offers considerable advantage in treatment,

because it lays down as a basis of this morbid disposition a uniform metabolic weakness. The exudative diathesis depends, according to Czerny, upon a congenital defect in the chemistry of the body, which manifests itself principally in those tissues which allow large variations in the water-content of the body. The exact manner in which this disturbance of the chemistry of the body causes the characteristic manifestations of the exudative diathesis is uncertain. This congenital defect manifests itself principally through a disturbance in the fat-metabolism, so that fat, especially the fat of milk arouses or increases the symptoms. From Czerny's definition it is seen that there is interference with the assimilation of those materials, which have the closest relationship with the watery content of the body, namely the salts. Upon this may depend the fact that there are children for whom mother's milk is not adequate nourishment. Cow's milk especially, represents, in many cases, either a too strong or an improperly mixed solution of salts. Sodium chloride is the salt which causes the most trouble in the exudative diathesis, in that it is not properly excreted by eczematous children. The misuse of carbohydrates has also an ill effect upon metabolism, and Czerny warns against a carbohydrate diet in the second year of life. I have seen, in children with eczema, as a result of a diet from which milk has been excluded, œdema develop very rapidly.

#### THERAPY.

The conception that all of the above-mentioned physical disturbances are dependent upon a constitutional weakness, imposes upon the physician the duty to attempt to alter the basis upon which the disease has developed, in addition to treating the condition symptomatically. In the main, the principle of the treatment will consist of diet, which, as it must be continued for a long time, must be of such nature that it will not interfere with the proper development of the child. Only a severe attack of facial eczema justifies the employment of radical treatment, such as Finkelstein's salt-abstracting eczema soup, in which the fat and albumin of one liter of milk is spread through whey thinned to  $\frac{1}{2}$  strength; or the use of a carbohydrate diet without milk, in very young

infants. In general, a diet in which there is a proper qualitative division of the ingredients, but in which there is quantitative limitation, should be used. In this diet, milk and milk-fat should be present only in such quantities as the age and nutritional condition of the child demand. In the first year, mother's milk is the best form of nourishment, if it is not present in too large a quantity. We often see, when large quantities of cow's milk are given in place of the scanty mother's milk, that an insignificant skin affection is decidedly aggravated.

These children require, early, an addition to the mother's milk. This may consist of farina with unsalted meat-soup, or vegetable juice. After the first year, small quantities of cow's milk may be given ( $\frac{1}{4}$  to  $\frac{1}{3}$  liter, daily). A mixed diet, consisting of meat, vegetables, including potatoes, raw fruit, and the various carbohydrates, in which fat is supplied in the form of cod-liver oil, is valuable even at this early age. Thin curds are a valuable form of nourishment. Sugar and carbohydrates should not be placed in the foreground. The replacement of the fat of milk by pastry and sugar is always bad.

What results can we expect from dietetic therapy? If the child has received large quantities of milk, or if the change to a more fatty nourishment was the cause of the eruption, a diminution in the quantity of the milk or a skimming of the milk is sufficient to bring about a cure of the condition. If a child with an intense rash is fed large quantities of milk, eggs, and butter, in "order to strengthen him," the above-mentioned simple diet will cure him in a short time. If large quantities of carbohydrates with or without skimmed milk have been used, a rational use of a milk diet may give relief. But every form of diet, which does not allow the child to thrive and develop properly, will sooner or later have an unfavorable effect upon the exudative diathesis.

The following is a good diet slip for children between  $1\frac{1}{2}$  and 2 years.

7 o'clock—Half a cup of milk with malt-coffee, a roll with plum-jelly or dry.

10 o'clock—Bread with pork-sausage or curds without butter, unsugared raw fruit.

1 o'clock—Soup, potato-soup, vegetables, and 30 to 50gm of meat, preferably without sauce.

4 o'clock—Jam on bread, or like 7 o'clock in the morning.

7 o'clock—Sandwich and fruit, or potato-soup and vegetables.

Once or twice a week, milk-foods.

In addition, two or three times daily, cod-liver oil. In poor families, the meat can be replaced, in part, by curds. The breakfast can consist of a quarter of a liter of buttermilk.

From the above it is seen that every form of nourishment may be of value.

Of internal remedies, which are supposed to have an effect upon the intensity of the eczema, a large number have been recommended. The successes claimed by the discoverers were in very few cases confirmed by others. We must not forget, in judging of the efficacy of a remedy, that the natural course of the eczema will often make it appear that the drug which is being used is responsible for the improvement.

Sodium citrate, which was so warmly recommended by Stoeltzner, was found to be without effect by Feer, while I obtained remarkable effects with it, unfortunately, in only a few cases.

Injections of blood-serum of healthy adults and the use of lime salts are still *sub judice*. In my experience, success and failure have been about equally balanced, but we hope gradually to achieve better results. Arsenic seems to be of value, especially in the dry itchy form of eczema.

Great care must be taken with these patients, in the use of cold compresses, hot packs, etc. The sensitiveness of the skin forbids the use of salt-water baths in infancy, whereas, in older children, with phlyctenulæ, the skin is less sensitive. Air and light therapy is especially valuable in these so-called scrofulous children.

Local therapeutic measures are necessary in eczema. Great care must be taken to keep the hands of the child clean. Scratching may be prevented in the infant, by the use of cardboard cuffs on the elbows, in order to prevent secondary infection. The severe acute inflammatory conditions are best combated by the use of dressings of Burow's solution, changed every 4 to 6 hours. They are especially indicated,



when there is fever. The softening of crusts on the scalp is best accomplished with vaseline rubbed in with cotton. After the acute symptoms have subsided, ointments applied to the face are allowable for a short time, but must not be too long-continued. A 10% alum-acetate ointment in vaseline is of value. It must be warned, that in cases of universal eczema application of ointments to a large portion of the surface of the body is exceedingly dangerous. Mopping with a 3% silver solution and powdering is the only form of treatment which is safe. During the critical periods, baths are forbidden.

In non-irritating infiltrated eczema, ointments of oil of cade are useful.

The teaching of the exudative diathesis cannot as yet make the claim to have cleared up every point. Both theoretically and practically, it must be developed further. However, it has not only shown us the relationship between various diseased conditions, which we had all instinctively felt, heretofore, but has also given us practical therapeutic hints, of great value.

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REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE NEW YORK  
ACADEMY OF MEDICINE.

By DR. MARTIN COHEN, SECRETARY.

MEETING HELD DECEMBER 16, 1912.

Dr. JOHN LESHURE presented a case of **hypophysis tumor** operated upon several months previously by Dr. Cushing, of Baltimore. The patient was a young male adult, without symptoms of trophic disturbance, but shortly before operation marked contraction of both temporal fields occurred with reduction of vision to  $\frac{2}{70}$  in the right eye, and  $\frac{2}{60}$  in the left eye. The diagnosis of hypophysis tumor was made from the bi-temporal hemianopsia, and a radiograph which showed marked excavation downward and forward of the sella.

Improvement in vision was almost immediate and has steadily increased:  $\frac{2}{20}$  with the right eye and  $\frac{3}{20}$  with the left. The temporal fields have expanded to about  $60^\circ$  in the horizontal meridian, although there still exists a quadrant-shaped defect involving the upper temporal half of each field; the fields for color remain greatly contracted.

Dr. A. EDWARD DAVIS reported the case of a tumor of the hypophysis in a female patient, which does not belong to the group of either hyper- or hypo-pituitarism, but rather is a composite picture with pronounced local or neighboring, but inconspicuous glandular or general symptoms.

Patient complained of blurred vision and headache with a history of diplopia, melancholia, and sluggish mentality. There was complete bitemporal hemianopsia, with large paracentral scotoma in left nasal field. R. V.  $\frac{2}{30}$ , L. V.  $\frac{2}{30}$ —, which was not improved by glasses. Left pupil, one-third larger than the right and sluggish to light. Both pupils

react to accommodation. Patient, whose genitals are infantile, has never menstruated.

Examination of the nose showed a hypertrophied, left middle turbinate, the anterior end of which, pressing against the septum, was removed. This afforded immediate relief of the left temporal pain, and the scotoma had entirely cleared six weeks later. R. V.  $\frac{2}{30}$  —, L. V.  $\frac{2}{40}$ .

In the discussion, Dr. JOHN E. WEEKS reported two cases of hypophysis tumor involving the upper and outer fields of vision. The color fields were reduced. There was no clinical evidence of acromegaly; X-ray showed enlargement of the sella turcica with absorption of the posterior clinoidal processes. Both cases were operated upon by the nasal route by Dr. Cushing, with uneventful recovery and improvement in the visual acuity and the field of vision.

Dr. OTTO SCHIRMER reported a similar case of a young man, aged 20. Had suffered from amblyopia and severe headache for ten years. When seen, the right eye was blind, and the left counted fingers immediately before the eye. The clinical picture was that of hypopituitarism; sexual powers were not developed.

Operation by Dr. Kammerer through the nasal cavities from under the upper lip. In approaching the hypophysis through its roof, a quantity of viscid fluid escaped, and the wound was closed. After many weeks of fever, the patient became well with no more headache. Vision, of course, could not be improved.

Dr. W. B. WEIDLER presented a case of **lipodermoid of the conjunctiva**.

Dr. ROBERT G. REESE presented a case of **restoration of the cul-de-sac by Wolff graft**, operated upon according to Dr. Weeks's method. This was the first one operated upon by him in which the result was satisfactory.

Dr. JOHN E. WEEKS had had only one failure out of the 27 cases operated upon. It was essential to attach the flap to the periosteal tissue at the margin of the orbit.

Dr. WILBUR B. MARPLE presented a patient who was operated on for a marked trachoma with pannus, according to the Heisrath operation, with a prompt and brilliant result after five weeks.

Dr. CLAIBORNE said it was unnecessary to sacrifice the entire tarsus in this operation.

Dr. GERALD H. GROUT presented a patient, 30, female, with a **disk-shaped opacity of the lens**, who had never been able to see very well, especially from the left eye, which had been injured in childhood. A disk-shaped opacity of about 2mm could be seen between the centre of the lens and the posterior pole; it appeared to be of uniform opaqueness and surrounded by a ring-shaped concentric opacity.

Retinoscopy through either the central or peripheral portions of the lens shows a myopia of 11 D. The vision in the right eye is  $\frac{20}{200}$  which can be improved to  $\frac{20}{60}$ . In the left eye, which is amblyopic, a similar condition is found.

In Dr. OTTO SCHIRMER's opinion the principal point in the diagnosis was that the anterior surface of the opacity was convex, while a concave one ought to be expected in an opacity of the posterior cortex. The anterior surface, therefore, must consist of layers belonging to the anterior cortex, and these must be displaced into the region of the posterior cortex. Microscopical examination of a small lamellar cataract had shown its posterior half split up and adherent to the posterior capsule. This adhesion developed, in all probability, while the lamellar cataract formed the whole lens, prevented the normal lens fibres from entering between cataract and posterior capsule and from forcing the cataract into the centre of the lens. He thought the diagnosis must be lamellar cataract displaced into the posterior cortex.

Dr. J. H. CLAIBORNE showed a **new glass for aphakia** with a correction of both far and near vision. The glass consisted of a toric convex lens in the lower portion of which an "invisible" segment was fused. Over the concave surface of the toric lens, covering the fused segment as well as the other portion, was a thin convex paster, so that the value of the glass above the fused segment corrected the distant vision by reason of the value of the paster plus the toric lens; and below, the reading vision was corrected by means of the paster plus the fused segment. The paster extended to the bottom of the toric, entirely covering the fused segment, but stopped 4 or 5mm short of the upper and outer and inner portions of the toric lens.



The lens was therefore very much lighter, more easily worn, and in the case presented gave better vision for far and near than any other form of cataract glass. The cosmetic result was most satisfactory, and Dr. Claiborne expressed the view that this form of cataract glass should entirely supersede the other forms in use. The glass which he showed was made by Bausch of Rochester, New York.

Dr. JOHN E. WEEKS stated there was a very similar cataract glass on the market.

Dr. ALFRED WIENER reported a fatal case of **orbital cellulitis**. Patient, 46, suffered from an acute exacerbation of a chronic ethmoiditis and chronic antrum disease, and developed thrombophlebitis of the orbit. In spite of a radical exenteration of the ethmoidal cells and the antrum of Highmore, followed by a complete exenteration of the orbit, the process spread into the cranial cavity. The patient finally succumbed to a purulent meningitis.

A pathological report with microscopical examination of the tissue was read.

Dr. WILBUR B. MARPLE read a paper, entitled **A visit to Professor Lagrange and some other glaucoma workers**. When visiting Professor Lagrange at Bordeaux, last summer, Dr. Marple witnessed several of his operations for glaucoma, squints, and cataracts. His present method of glaucoma operations differs in several particulars from that described by him in 1906. The length of the section is now diminished to 5 or 6mm, thereby greatly lessening the danger of the operation.

After the completion of the section he does the iridectomy, and the sclerectomy last. The tension in all the cases observed was high, and the iris prolapsed immediately after the section, and the iridectomy was made with the de Wecker scissors, in some cases several cuts being necessary. Instead of introducing the spatula into the anterior chamber to restore the pillars of the coloboma, he stroked over the cornea with the spatula. The last step in his operation of to-day is the sclerectomy, but Lagrange has discarded the scissors, and has used for the past two or three years a modification of the Vacher punch. In some half dozen cases, Lagrange had done sclerectomy without iridectomy as an experiment.

They all showed the "ampoule" or filtering cicatrix, and all had normal tension. At present he always does the combined operation.

The tension of glaucoma cases is always recorded by the Schiötz tonometer both before and after the operation. Several things about his clinic I observed, which were very useful. He had his sterile solutions in little glass tubes drawn to a point at each end. When he wished to use the solution, each end was broken off, and a rubber cap such as is used in a dropping tube was slipped over one end, and the solution thus used. He has also devised an ingenious glass irrigator shaped something like a lid retractor, which is introduced under the upper lid, and a bottle containing the solution is then elevated, and being connected by means of a rubber tube with the glass irrigator, the upper lid is very effectually irrigated.

In squint operation, he advanced the muscle up to the limbus. He has employed an operation for detachment of the retina, which method, however, I do not care to describe as he has not, as yet, published the description himself. Its object is just the opposite of the Lagrange operation in glaucoma—that is, instead of securing filtration, it interferes with filtration, and thus increases the tension of the eye. He has accomplished this much in several cases.

The filtering cicatrix was suggested by de Wecker as long ago as twenty years, but whatever operation for chronic glaucoma ultimately becomes the one of choice, to Lagrange certainly belongs the distinction of being the first to offer something practical towards producing the filtering cicatrix.

Major Herbert, who, as is well known, has devised four operations for glaucoma, was next visited at Nottingham. His operations have been:

First, subconjunctival fistula formation.

Next, "wedge-isolation" operation, and then the small flap sclerectomy. He is at present endeavoring to devise an operation for glaucoma in which iridectomy will not be necessary. He does this in what he calls his "stretching" operation—that is, entering the anterior chamber with a broad needle by an incision through the sclera into the periphery of the anterior chamber, he next introduces a pair of forceps

into this wound, by means of which he forcibly stretches it. He thinks that this forcible stretching may result in delayed healing, and to ultimate filtration.

Mr. Priestley Smith, whom I saw just before leaving England, feels confident that Major Herbert is ultimately going to succeed in devising some useful operation in glaucoma, and stated that they had used his "wedge-isolation" operation in a number of cases in Birmingham, and with satisfactory results.

Christiania was next visited in order to meet Professor Schiötz and Dr. Holth. Professor Schiötz has devised a form of his tonometer for use where the cornea is irregular. He accomplishes this by having a special corneal plate with part of it cut away. Professor Schiötz had decided opinions (with which I quite agree) about men who appropriate most of the carefully marked out features of an instrument devised by someone else, make some slight change in it which detracts from its value, and presto! give it their name, with never so much as an acknowledgment that it is only a modification of someone's else instrument.

Before cataract extraction he epilates the lashes of the lids, and also applies a test bandage overnight. If there is secretion, the lids are treated before operating. He has done the Elliot trephining operation during the first eight months of 1912 in about 70 cases, and is well pleased with the results. The poorest results are in the cases of absolute glaucoma.

Dr. Holth has done the scleral trephining in cases of detachment of the retina, and thinks that if the retina is not ruptured the results will be good.

In tattooing he makes a shallow cut in the center of the cornea with a trephine the size of the desired pupil. This central area is thoroughly pricked with a needle without any pigment, and afterwards the pigment is rubbed in. It was Dr. Holth who first employed the punch instead of the scissors to perform sclerectomy.

Professor Bjerrum, of Copenhagen, whose method of perimetry is the most delicate test we have for the presence of glaucoma, was next visited. Professor Bjerrum resigned his position in the University about two years ago on account of his health, but before doing so designed the present beautiful



eye hospital, which is a part of the University, one of the best equipped hospitals I have seen in Europe.

As to whether the Lagrange operation or trephining will be the operation of choice in chronic glaucoma, the next five years will probably show. At present, at least, more men are using trephining abroad, and I suspect that ultimately this will be the operation of choice.

MEETING OF JANUARY 20, 1913.

Dr. LEWIS W. CALLAN presented two cases of **simple glaucoma**, operated on by trephining with **Verhoeff's instrument**.

Dr. L. W. CRIGLER reported the case of a ten-year-old boy suffering from **caustic burns of the right cornea and conjunctiva**, due to the spurting of the liquid contents of a golf ball. A local physician applied cold compresses, and Dr. Crigler saw the case seven days later. The conjunctiva showed numerous areas of necrosis and the cornea was opaque. The destruction had extended to the substantia propria; the pupillary border of the iris could scarcely be seen, and vision was reduced to shadows. After the usual hospital treatment had been applied and the more aggravated symptoms had been relieved, the patient was discharged, with instructions to report once a week, which has been done. The cornea is now becoming slightly more transparent and the necrotic areas have undergone cicatrization. Vision is slightly improved, the patient being able to count fingers at one foot.

The contents of a similar golf ball were analyzed. The rubber bag in the centre contained a mixture of barium sulphate, soft soap, and free alkali (sodium hydroxide) 2.4%. Wound tightly around the bag are strips of rubber and a hard coat or shell composing the outer surface.

Dr. ARNOLD KNAPP presented a case of trephining (Elliot's operation) for **glaucoma in an eye with atypical retinitis pigmentosa**.

The patient, female, 45 years old, has suffered from hemeralopia for many years. No consanguinity of parents. Glaucomatous prodromal symptoms in left eye for two years. Left eye  $V = \frac{2}{50}$ . Shallow anterior chamber. Tension +2. Cornea dull. Fundus showed retinal atrophy with pigmentation,



which did not extend to the periphery. The field shows a central preserved area ( $5^{\circ}$ - $15^{\circ}$  from fixation point) and an irregular preserved area in nasal periphery. Trephining was decided upon as subjecting the eye to the least risk. To-day there is a distinct clear bleb with a black spot indicating the trephine opening, a successful filtering "scar." The tension is subnormal. The association of increased tension and retinitis pigmentosa is interesting; it was Weiss who drew particular attention to this some years ago.

*Discussion:* Dr. CARL KOLLER had recently performed the Elliot operation in five cases with satisfactory results, and he considered the avoidance of iridectomy a great advantage. The disk which is removed by the trephine should consist of half scleral and half corneal tissue.

Dr. WOOTTON next presented a case of **oxycephaly** in a negro child 8 years of age. The vertical diameter of the cranium was markedly elongated. Both eyes protruded and were totally blind, both disks showing extreme atrophy. Orbits shallow, and sella turcica crowded forward. Well marked involvement of the accessory nasal sinuses. Had recently been operated upon for bilateral mastoiditis. Wassermann reaction negative on two occasions.

Dr. WALTER B. WEIDLER reported a case of **coloboma of the lens**. Patient was a ten-year-old boy who suffered from poor vision and occasional headache. Corneal measurements: O. D.  $12 \times 12$ , O. S.  $10 \times 10\frac{1}{2}mm$ ; the long axis was at  $60^{\circ}$ . The palpebral opening on the left side was  $8mm$  and on the right  $12$ . Media clear. There is a large conus or congenital staphyloma of disk involving about one-fourth of its diameter. There are peculiar parallax movements of the vessels of the fundus which may be due to a partial dislocation of the lens or to a difference in thickness of the lens itself, because at the inner side of the lens a distinct coloboma exists, directly in the horizontal axis of the lens. The view of the fundus is unrestricted through the portion where the coloboma exists.

Dr. WEIDLER next presented a **specimen showing a wound of the cornea** with a piece of wood at the posterior part of the ciliary body. The wound is plainly seen, with an ingrowth of the corneal epithelium along the edges. Prolapse of iris into wound, detachment of the ciliary body forward due to

traction of the prolapsed iris. The lens material absent probably absorbed; remnants of the capsule are present. Detachment of the retina with suppurative exudate, which surrounds the foreign body. The latter is seen posterior to the ciliary body, almost in contact with the sclera, 1 mm wide and 3 long.

Dr. J. G. DWYER read a paper on the **Treatment of recurrent hordeola with autogenous vaccines**, with report of 27 cases (published in full in this number).

*Discussion:* Dr. CLAIBORNE considered the paper a very interesting one and referred to his having reported at a previous meeting the vaccine treatment of hordeola. He hoped the paper would create interest along the lines of vaccine treatment of eye diseases, although he personally believed in using the cautery in infectious corneal ulcers rather than waiting for the effects of the vaccine treatment.

Dr. KNAPP asked how long it takes to manufacture an autogenous vaccine, and also what the results were with Hiss's leucocytic extract in the treatment of severe intraocular infections.

Dr. WEIDLER said he had used this treatment for hordeola and found the results to be excellent. The tuberculin treatment should in his opinion be oftener resorted to.

Dr. WOOTTON referred to a case of chronic dacryocystitis which was treated along these lines for about a month with 4-6 injections and cured in 4 weeks, without any other treatment, no recurrence having set in after 3 years. He also asked what the duration of a case of gonorrheal iritis was, when treated with gonorrheal vaccine.

Dr. SCHOENBERG was surprised to hear of these successful results, because the experience of foreign authors was to the contrary. He further inquired how it was that dermatologists were unsuccessful in treating acne with vaccine, as the success referred to in Dr. Dwyer's paper did not coincide with them. As to the tuberculin treatment, the effect of the antigen on the tissues was still undecided, as the facts of the treatment could not be positively verified.

Dr. OTTO SCHIRMER asked whether one organism and one vaccine, or a series, was responsible for the results as described.

Dr. DWYER, in closing the discussion, said that in regard to the contention of Dr. Claiborne, regarding the proper spelling of the word "hordeola," he could only say that this was the spelling used by the text-books of ophthalmology, but in fact he had never given the matter any thought. Dr. Claiborne had spoken of the superiority of the actual cautery over any other agent in stopping the extension of an ulcer, but the fact remains that in addition to stopping the ulcer, great damage is done to the cornea, so much so that sometimes the cure is worse than the disease: the cornea is injured by the cautery for some distance in advance of the disease. During the last five years, the writer had seen a very considerable number of ulcers of the cornea and certainly to his mind, there was no comparison between the condition of the eye after the use of a vaccine and a parallel case after the use of the cautery. Of course, as the writer has said in his article, there are many cases of ulcer where he was unable to find the bacteriological cause, and in such cases he went ahead with the ordinary treatment or actual cautery, as seemed best.

In reply to Dr. Knapp's question, an autogenous vaccine can be ready for use in about thirty-six hours, if we are fortunate in getting a pure culture at the start, and the speaker aims at this so as to save time isolating the different organisms. Where the necessity for speed was not so great, the time elapsed from the time of taking the culture until being ready for use would be about three days. Dr. Knapp had asked regarding the Hiss leucocyte extract, especially in eye infections. The writer has used this now in over four hundred cases of various pyogenic infections, and the more he had used it, the more convinced he was that the extract is the most powerful agent we had to overcome the ordinary infections that we meet with and which nothing seems to control. To isolate a few examples of cases treated from the large number treated Dr. Knapp probably had in mind the case treated for him. This was a case of infection following cataract extraction and due to an infection with *staphylococcus pyogenes aureus*, the patient having had an old conjunctivitis due to this organism. In this case, recovery was complete and was all the more gratifying, as the patient had lost the other eye



the year previous, the same infection following a cataract extraction. We have now on our records several such cases, and we believe that without the use of the extract these eyes would have been lost, as is usually the history of such cases. The speaker would here like to say that it would certainly be advisable, before doing a cataract, to make a bacteriological examination of the conjunctival sac, as he believes that many of the infections following cataract operations are due to a pre-existing infection of the conjunctival sac, and this is not suspected, the cause being looked for in some error of technique or in the operating room, when it exists in the eye of the patient. There is quite a collection of literature on the leucocyte extract now and it would be well worth reading.

Dr. Schoenberg has made the criticism that all the cases reported have seemed to be successful and that no failures were reported. The speaker thinks that if the Doctor had followed the paper closely he would not have got this impression. Out of dozens of cases examined, these were chosen as suitable for vaccine treatment, as in the big majority of cases we found either no organisms, only saprophytic organisms, or such a variety of organisms that we could not isolate any species as being the causal one. Thus, for example, in the series of dacryocystitis cases, smears and cultures were made from twenty or thirty cases, and practically all were rejected except the series reported, because of the above fact. The vaccines are not advocated as a cure-all by any means, but the fact remains that the ophthalmologists have been very slow at accepting an agent that is rational, logical, and so easy of application. Now with regard to Dr. Schoenberg's remarks as to the failure of the dermatologists in the treatment of acne, etc., with vaccines, the speaker thinks that Dr. Schoenberg makes no distinction between acne, furunculosis, and possibly sycosis and has spoken of them all as acne, and this has no doubt led the doctor to speak of such failure. Now, acne, furunculosis, and sycosis are three absolutely distinct diseases. The literature just teems with reports of the success attained by the use of vaccines in furunculosis: I do not remember a report that was not favorable to their use in such a condition—that is, any series of cases. With regard to acne, this is different, as it is only in the last couple of years



that we have been able to isolate the acne bacillus as the cause of acne and look upon the staphylococcus as only the secondary factor, whereas previously to this we had been using only a vaccine of the staphylococcus. Now, a combination of vaccines of the acne bacillus and the staphylococcus is giving much better results.

In conclusion, the speaker would like to state that he can not understand why at this stage of the development of bacteriology, the ophthalmologist does not make use of the discoveries in bacteriology and apply them in the treatment of eye infections. There certainly is more reason why the ophthalmologist should be conversant and up-to-date in bacteriology than in operative work as he is called upon to treat far more infections of the eye than operative cases.

MEETING OF FEBRUARY 17, 1913.

Dr. JOHN M. WHEELER presented a case of **retinitis circinata**. Mary Daagan, 50, Irish-Canadian, complained of rheumatism in the knees and asthenopia in both eyes. Sight began to fail about 14 months ago. Family and personal history negative.

*Examination:* Right eye counts fingers at 2 ft., left at 12 ft.; dustlike opacities in the left vitreous. Whitish glistening circle surrounds the macula. It is complete except for a very small opening in the upper nasal quadrant and a slightly larger opening in the lower nasal quadrant. Atrophic changes in macular region with deposition of pigment. Aside from the stippling near the ring, the fundus is normal outside the circle. On several examinations there were no hemorrhages in the eyes. The left eye shows changes in the macular region, but no circinate lesion.

Nothing abnormal about the urine, except low specific gravity (1.005) and a low percentage of urea. Wassermann negative. Coagulation of blood in 75 seconds. Blood count normal, except that the small mononuclear cell count is high (46.4%) and the polynuclear cell count a little low (56.5%).

Dr. H. W. WOOTTON said that all cases seen by him had been associated with hemorrhages.

Dr. EMIL GRUENING had found that many of these patients

asked whether the other eye was in danger of becoming involved. In his opinion the condition was unilateral and stationary and the pathological process was due to a retinal connective-tissue formation.

Dr. J. HERBERT CLAIBORNE stated that the ring in these cases was generally broken.

Dr. JOHN R. SHANNON thought that the diagnosis in the present case could not be mistaken.

Dr. LEWIS W. CRIGLER presented a case of **hole in the macula** with retinal detachment.

Young woman, 20, was struck on the ball of her left eye by a cork flying from a bottle. Vision was suddenly and completely destroyed. The eye became red, irritable, and inflamed. After about five months she began to see things indistinctly in the lower left temporal field.

*Examination:* There is a perfectly round red spot in the macula, about one-half the size of the disk. The temporal side of the disk is pale and the retina is detached in its lower and outer part.

Various theories have been advanced to explain such a condition. Fuchs thinks that there must first be an oedema of the retina, which would explain why all cases are not traumatic in origin. Ogilvie thought that the hole was produced by contrecoup, which, however, could not be proved as there was always an opacity of the retina previous to the appearance of the hole. Parsons states that rupture of the retina at the time of injury is not the cause of a macular hole.

In the present case it is most likely that there was first a hemorrhage beneath the retina in the part not showing the detachment. This in turn gave rise to an oedema which occurred at the posterior pole, resulting in complete atrophy of the papulo-macular bundle.

Dr. EMIL GRUENING said that the hole was generally circular, and the remarkable thing in the present case was its uniform redness after the lapse of a year.

Dr. GUTTMAN had had a similar case which he considered a hemorrhage in the macular region. It was oval and became paler after a time.

Dr. W. B. WEIDLER's case was one of a hole in the macular region without any history of injury.

Dr. JOHN R. WHEELER had reported two similar cases of traumatic origin at a previous meeting.

Dr. H. H. TYSON presented a case of **congenital conjunctival apron** (Conjunctivalschürze of Schapringner).

Mrs. R. G., 40, born in Hungary, applied to the N. Y. Ophthalmic and Aural Institute for poor vision in her left eye.

V. R.  $\frac{20}{30} + 0.75 \frac{20}{20}$ . Fundus normal.

V. L.  $\frac{20}{20} - 10.00 \frac{20}{100}$ . Scl. chor. post.

The everted upper lid corresponded to the description given by Schapringner, who has reported 8 cases in literature:

"It appeared as if the conjunctiva near the fornix had been pinched with a wide forceps, lifted up and then pressed back upon the tarsal conjunctiva. There is no complete adhesion, because a probe can be passed partly or entirely beneath it." His explanation as to its etiology was "that admitting that during the embryonal life the amnion adheres to the layers from which the lids will be formed and that, by pulling in that way, a fold in the future conjunctiva originates. Later the amnion separates from these tissues and the fold remains permanently."

All of Schapringner's cases were from Austria and Russia and the present case came from the same section, Austria-Hungary. None complained of the malformation, neither did the present one. No history of traumatism, operation, or inflamed eyes could be obtained from her.

Dr. SCHIRMER, who has seen two similar cases (unreported), considers the present a typical case of conjunctival "Schürze."

Dr. F. W. SHINE presented a patient who had a **piece of wood** removed from the **ethmoid**.

Boy, 12, admitted to N. Y. Eye and Ear Infirmary, Feb. 1, 1913. Eight days before admission, was struck in left eye by a piece of wood about one foot long. Treated in General Hospital. On admission, condition appeared to be orbital cellulitis. Eyelids swollen, eyeball in condition of proptosis, conjunctiva greatly chemosed. Superficial ulcer lower part of cornea. Anterior chamber and vitreous clear. Examination of nose negative. No wound of conjunctiva or ex-

ternally. Palpation unsatisfactory on account of pain and tenderness. Condition improved under hot compresses, argyrol, and irrigations, but became worse on Feb. 4th after a good deal of pain during night. In hope of finding pus, incision was made in conjunctiva to nasal and temporal sides, orbit probed in all directions; none found. Swelling and other symptoms increasing. On Feb. 6th, under ether, a small tumor-like mass was made out on deep palpation over the region of the ethmoid. Through an incision in lower cul-de-sac a piece of wood was extracted,  $1\frac{1}{2}$  in. long and  $\frac{1}{4}$  in. broad, which had been embedded in the ethmoid cells. No pus. Swelling subsided rapidly, though it was necessary to snip the lower palpebral conjunctiva in half a dozen places to relieve chemosis.

Dr. I. M. HELLER reported having treated the patient previously for an orbital abscess in absence of history of trauma. Incised and drained the wound, but patient left the hospital and did not return for observation.

Dr. L. W. CRIGLER had had a similar case without any history of trauma. It was associated with exophthalmos, and under similar treatment a piece of wood was removed.

Dr. CLAIBORNE had found a piece of wood in the conjunctiva which had been present for several months without causing any secretion or exophthalmos.

Dr. W. E. LAMBERT had treated a patient who had fallen on his upper lid two weeks before. By probing the affected area, a stick was found. Vision was destroyed. He believed that Dr. Shine's case might go on to optic atrophy.

Dr. C. B. MEDING read a paper entitled **Another view of the Indian cataract operation** (given in full in this number of these ARCHIVES).

*Discussion:* Dr. DORLAND SMITH of Bridgeport, Conn.:

I was not dissatisfied with the capsulotomy operation for cataract before I visited India last fall. Most of the patients operated on by my partner, Dr. F. M. Wilson, and myself eventually obtained useful vision; often very good vision, though usually after one or two needlings. I went to India, therefore, with the idea that unless the intracapsular operation made a distinctly better showing than the regular operation (a thing which then seemed very doubtful), I should continue



with the latter operation. I was happily disappointed. To my great surprise, the removal of the capsule with the lens, removed also not only all iritis, but all irritation and the necessity for frequent dressings. That the capsule when left behind often behaves like a foreign body, is now obvious. For these reasons, and because of its better average visual results, I am now doing the intracapsular operation of Colonel Smith, as the operation of choice.

As to immature cataracts, the rule seems to be to wait as long as the patient will let us, rather than take chances. By the intracapsular method a cataract in any stage of immaturity can be operated upon as easily and as successfully as a mature cataract.

The intracapsular operation itself is not one of great difficulty. Its success, however, depends largely upon two things which are often overlooked by operators who have not learned their necessity in India.

First: The variations in direction and amount of pressure with the lens hook, which must sometimes be made very quickly to meet changing conditions, require not only lightness of hand, but a confidence in one's own ability to meet these conditions which only considerable experience with this method can give. This is especially true in the more difficult cases. And there is a very much wider difference between easy and hard cases in the intracapsular than in the capsulotomy operation.

Second: The assistant must be more than capable. He must have been so long and so thoroughly trained in this particular operation that he can hold the lids and brow so that under *no* conditions can a particle of pressure be exerted on the globe except through the instruments of the operator. To attempt the intracapsular operation without such an assistant is to court disaster, unless the case is exceptionally easy. Far too little attention has been paid to these facts.

The complications of the operation vary with the difficulty of the cases, and with the experience and skill of the operator. Some of the complications of the capsulotomy operation do not occur in the intracapsular; and the reverse is also true. Loss of vitreous is occasionally inevitable, but it should occur no oftener than in the capsulotomy operation. Rupture of

the capsule is an unpleasant accident, but skill can usually bring about its removal without prejudice to the result. A very tough zonule, a flat disk-shaped lens, or a very prominent eye makes the operation more difficult. These can usually be managed if one observes the conditions and keeps constantly alive to the mechanical problem involved. The easy cases, which are in the large majority, are often very easy.

The excellent visual results seen in India, both immediate, and some years after operation, should also be obtained here. Iris incarceration and prolapse seemed slightly more common in the restless Indians, than in our patients, but are of very much less serious import when the capsule is out. I believe that the intracapsular operation, when it becomes better known, will prove to be the safest and best operation for cataract.

Dr. EMIL GRUENING thought it desirable to remove the capsule in all cases, but believed there was the danger of complications in the intracapsular operation. He considered the visual results obtained by him in capsulotomy to be sufficient for all practical purposes. In immature cataract he used the Homer Smith operation. The intracapsular method not only required a specially skilled operator, but also an assistant similarly qualified.

Dr. CLAIBORNE considered the section with one sweep of the knife impossible in certain cases. Utility rather than perfect vision should be considered in the cataract operation.

#### RESOLUTION.

It is with feelings of the deepest regret that the Ophthalmological Section of the New York Academy of Medicine records the death on December 16, 1912, of Dr. EDWARD L. OATMAN, at the height of his brilliant career.

A physician of exceptional ability and scientific attainments, and a surgeon of approved skill, he brought to this Section, and to the profession, the fruits of a mind accustomed to acute analytical reasoning and a disposition actuated by intensity of purpose.

The loss inflicted by his death will be deeply felt by the

members of the Section, of which he was for so many years a distinguished member, and by the medical profession at large, among whom he counted so many warm and personal friends.

RESOLVED, That the Secretary be instructed to convey the sympathy of the Section to the members of his immediate family, and that a copy of this report be spread upon the minutes of this meeting in recognition of his personality and attainments.

(Signed) H. W. WOOTTON  
WALTER BAER WEIDLER.

REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE ROYAL  
SOCIETY OF MEDICINE.

By C. DEVEREUX MARSHALL, F.R.C.S. LONDON.

A meeting of the Section was held on Wednesday, 5th of February, under the presidency of Sir ANDERSON CRITCHETT, C.V.O.

Mr. G. COATS showed a case of **congenital mesoblastic strand** adhering to and penetrating the cornea. He suggested that if, in early foetal life, the amniotic fluid was not sufficiently developed, or was too scanty, the amnion might come into contact with eyes which were prominent at the time, and might acquire adhesion to the developing eye. Mr. A. RUGG GUNN showed a case of **persistent hyaloid artery** with massive white formation obscuring the optic disk. Mr. A. S. COBBLEDICK showed a case of **congenital deformity of the inner canthus**. Mr. J. B. LAWFORD exhibited a case of **disease in the region of the pituitary body**. He believed the lesion exerted pressure on the chiasma; the patient showed no definite evidence of acromegaly; he had loss of sexual power, and was very drowsy. Mr. R. W. DOYNE alluded to the prognostic importance of ascertaining the color fields beforehand. Dr. GRAINGER STEWART pointed out that the patient had the two other features associated with the condition to which Cushing drew attention, namely, general pallor, and a long distance between the ear and the corner of the eye. The President showed a patient on whom he had performed peritomy because of kerato-iritis, the whole of the vascular conjunctiva having been very much thickened. Mr. BICKERTON (Liverpool), Mr. CRUISE, and Mr. RAYNER



BATTEN referred to the good results sometimes yielded by the operation, as in this case.

Resumed discussion on the physiology of intraocular pressure.

Mr. MARTIN FLACK, in resuming the debate criticised the schema submitted to the last meeting by Professor Starling, as it did not take account of any capillary bed and the resistance due to it; thus the conditions obtaining in the eyeball were not adequately represented. Moreover, to hypothecate rubber for the layers, and for the fluid water, did not establish a parallelism with actual conditions. He proceeded to elaborate the argument which Dr. Leonard Hill submitted in his opening, and said that Dr. Hill's work on the circulation in the brain had not yet been proved to be wrong, although it was published a number of years ago. Admittedly the eye was not quite rigid, but it was sufficiently so for physiological purposes. When a skull was trephined, and the rigidity of the skull thereby modified, it did not interfere with the cerebral circulation. In Dr. Hill's and his own view the tissue fluid was maintained not by any filtration pressure to the *vis a tergo*, but to the pulsatile expansion and shrinkage of organs, and the expressive action of both intrinsic and extrinsic muscles, as well as by changes in posture, gravity, etc.

Mr. THOMPSON HENDERSON (Nottingham) declared that his views on the physiology of the intraocular pressure were entirely dominated by the splendid work of Dr. Leonard Hill on the intracranial pressure. He, the speaker, maintained that the intraocular pressure was not a question of volume, but that it stood and varied with the intraocular venous pressure. Some of the views disregarded the fact that the vessels were embedded in a loose tissue stroma, which was in open communication with the angle of the anterior chamber. Therefore the ciliary epithelium could not act as a mere passive filtering membrane, because the pressure on both sides of it was the same, and if fluid did escape from the vessels, it would make its way direct into the angle of the anterior chamber. He exhibited sections of eyes of different animals, and submitted that the anatomical conditions about the angle of the anterior chamber were such as to absolutely preclude

any idea of filtration of aqueous. He had now a collection of 13,000 sections of eyes, mounted serially.

Mr. HERBERT PARSONS said he could not understand the antipathy to the filtration idea shown by Dr. Hill and his colleagues, who seemed to introduce a very difficult method of physico-chemical influence to account for processes which were explicable on simpler grounds. He could not see anything in the present discussion, so far, to cause him to modify the views he expressed in his work on the pathology of eye conditions, though perhaps he might have been a little more careful in the diction in which it was clothed, so as to obviate the criticisms which were sometimes directed unfairly against one's terminology. He proceeded to comment on weak points in Dr. Hill's experiments, and to argue that, the walls of the globe not being rigid, unless the animal were curarized in the experiments, enormous pressure was exerted by the extrinsic muscles. He was the first to show that the increased pressure produced on stimulating the peripheral end of the cervical sympathetic, was due to retraction of the unstriated muscle of the orbit. He did not think that the consideration of the mode of production of accommodation was germane to the present discussion.

Mr. RAYNER BATTEN demonstrated his views on intra-ocular pressure by a series of a child's ordinary rubber balloons.

Mr. GREEVES pointed out that Coster found, in his experiments, that there was a definite increase of volume when the intraocular pressure was raised, and he had himself experimented upon it with fresh pigs' eyes.

Professor STARLING and Dr. LEONARD HILL then replied in detail on the whole debate, and were heartily thanked by the Section.

At the meeting of the Sections on Ophthalmology and Neurology on March 5th, under the presidency of Sir ANDERSON CRITCHETT, C. V. O., the subject of discussion was **disease of the pituitary body**. Professor SCHAFER opened with a very detailed exposition, aided by numerous slides, of the structure and functions of that body. He said the pituitary body was present in all vertebrates which had been examined, therefore it must be an organ of considerable morphological interest. Its development occurred as an extension of Rathke's

pouch, which was an invagination of the buccal ectoderm towards the brain. This was met by a hollow downgrowth from the thalamencephalon, and the combination of the two into one organ formed the pituitary body. The gland consisted of three parts: (1) pars anterior, (2) pars intermedia, (3) pars nervosa. Usually it was separated into two parts, the anterior and the posterior lobes. Remarkable alterations occurred in the pituitary as the result of thyroidectomy, and similar changes seemed to result where atrophy of the thyroid ensued. The alterations after thyroidectomy included (1) enlargement of the pituitary body, (2) the presence of a colloid substance in the vesicles in the pars anterior, and a great increase in that of the pars intermedia; (3) a great increase in the number of hyaline bodies in the pars intermedia and pars nervosa. It was not easy to explain these changes physiologically, because the functions of the two glands were not identical, though probably both were connected with sexual development; for in the case of removal of either there was a stunting of growth and sexual infantilism. Moreover, castration had been observed by most to be followed by hypophysial hypertrophy. The greatest enlargement of the pituitary body was found in giants and acromegalics; the skeleton of giants was characterized by a disproportionately large sella turcica.

The physiology of the pituitary body had been investigated experimentally by methods of both removal and addition, the latter by administration of extracts of the gland, and by implantation. The evidence following removal was conflicting. Young animals which survived extirpation had their growth retarded, and their sexual activity remained undeveloped. But some observers stated that total removal was not fatal, death, when it occurred, having been due to the complications of the operation. Mere injury to the pituitary might cause marked polyuria, but it disappeared after a few days. Possibly this was the explanation of the polyuria sometimes seen in association with fracture of the base of the skull. Feeding with fresh or dried gland substance was, normally, not attended with any obvious result, even in growing animals. There was certainly no retardation of growth, such as had been described. Attempts to graft the organ



had usually been unsuccessful. Saline extracts of pituitary, injected intravenously, had a marked effect upon all involuntary muscles: they caused constriction of most of the blood-vessels of the body; a powerful and usually slowed action of the heart, the tone of which was increased; contraction of bladder, uterus, and bowel; and the pupil of the excised eye in the frog was dilated. The substance producing these results was of a relatively simple chemical nature, was soluble in water, and dialyzable, and was not destroyed by repeated boiling, nor by long keeping in a dried state or in a sterilized condition. It was insoluble in alcohol and ether. Intravenous injection of pituitary extract excited secretion in certain glands, such as the kidney, and in the mammary gland during lactation; there was dilatation of the renal arteries, though the effect on the general arteries of the body was constriction. The substance producing effects upon blood pressure, heart, and kidney was contained only in the posterior lobe, and it had been found in the cerebro-spinal fluid. According to the observations of Ott, Scott, and Mackenzie, the galactagogue hormone of the pituitary was also confined to the posterior lobe, and it was assumed to be identical with that which caused the other effects upon blood-vessels, heart, and kidney. The anterior lobe seemed related to the general growth of the body, especially that of the skeleton; while the posterior, including the pars intermedia, probably promoted the contractility and increased the tone of plain muscular tissue.

Mr. J. HERBERT FISHER commented on the **complexity of function of the two portions of the pituitary body**, and the supreme importance of the gland to life, and its interactions with other ductless glands. Colloid material was also formed, as in the case of the pituitary, by rare tumors which sometimes developed in the remnants of the post-anal gut. He also remarked on the fact that castration and oöphorectomy caused some overgrowth of the pituitary body, while the hypophysis enlarged during pregnancy. He believed the climacteric was prematurely reached, or in the male impotence, by months and even years before other symptoms pointed to disorders localized to the hypophysis, and in this direction observations of gynæcologists might be valuable. Hypoplasia of the adrenals was also accompanied by retarded



sexual development, while hyperplasia was associated with excessive development of secondary sexual characteristics. A case exhibited by Dr. Turney showed pituitary disorder with adiposity and abnormally raised blood pressure, undue pigmentation of skin, and liability to spontaneous bleeding. For diagnostic purposes, the ophthalmic surgeon worked chiefly with his perimeter in recognizing and watching pituitary disease. The typical condition was one of bitemporal hemianopia; though that statement did not cover the question. Cases had been recorded in which a central scotoma resembling that seen in tobacco amblyopia existed, but in which the extension of the scotoma resulted in bitemporal hemianopia. He did not see how pituitary tumors could press first at the anterior angle of the commissure; still, X-rays were very serviceable for proving or negating the existence of bone erosion. Mr. Doyne had shown that hemianopia of the color sense might precede that of the form sense, and give a guide to prognosis; and with that Cushing agreed. In a proportion of cases of pituitary body enlargement, homonymous hemianopia was a symptom in the earlier development of the case, but he was convinced that an evenly-balanced loss of the temporal field in each eye of simultaneous onset was the exception. Direct pressure on the optic chiasma, so glibly invoked, was far from being a satisfactory explanation of most of the cases. He asked whether neurologists believed that the anosmia present in some pituitary cases could be attributed to involvement of the uncinate gyrus. He believed the visual phenomena were explicable by traction effects on the visual pathways, as the tumor extended behind the chiasma and between the optic tracts in the interpeduncular space. For operation, he favored a route through the fronto-temporal opening of the cranium. If this method were pursued, the free removal of the bone and opening of the dura mater on the opposite side allowed more freedom for elevation and displacement of brain, and thus gave more ready access to the pituitary region.

The discussion was resumed on March 12, 1913, by Dr. TURNER, who discussed at length a case which had been under his care, and whom he showed at the last meeting. The symptoms referred mainly to the posterior lobe. The

patient was a lady, æt. 25, who until 1907 was in no way abnormal. Before that time her menstruation had been regular, but since then it had been entirely absent. Her friends remarked on her increasing stoutness, and during the last two years she noticed she bruised with unusual readiness, especially on the legs. She also had pain in the back, starting from a kyphotic curve in the upper dorsal region and travelling round the ribs. Mentally she seemed unaffected, and her sight remained good, except for the slight error of refraction which she had always had. Thyroid extract had been administered repeatedly, but had to be given up on account of palpitation. In spite of the obesity present, her weight was now less than formerly; her face was now fat and florid; there was no puffiness about the eyes. The hair was dry and somewhat scanty, but the eyebrows were present. The expression was bright, and the manner alert. Skin not pigmented, pubic and axillary hair scanty. The upper limbs were of normal size, but lower limbs and buttocks thin. The thyroid was normal in size and consistency. No evidence of enlarged thymus, lymphatic glands, or spleen. X-ray examination showed absorption of posterior clinoid processes. There had never been increased intracranial pressure or involvement of the nervous system. In July, 1912, Mr. J. H. Fisher reported that the white, blue, and red fields were not transposed, and there was no certain evidence pointing to the probable development of temporal hemianopia. On recent examination, surrounding four-fifths of the right disk there was now a subretinal exudation of glistening character and ill-defined limits; no blood there at present except two or three very fine spots on the white area; otherwise each fundus was normal. The blood pressure on admission was 200mm of mercury, and it had remained at about that level ever since. There was a tendency to polycythæmia, without other blood changes. At one examination the red cells reached eight millions. There had been a spontaneous fracture of the sternum between the manubrium and the gladiolus. The urine was normal, and there was no polyuria. The sugar tolerance limit was normal at about 120 grammes of lævulose. Professor Dixon had examined the urine, and found it to contain a pressor sub-

stance in considerable quantity: 10cc of the urine injected into a cat raised the blood pressure 70 or 80mm, whereas a similar injection of normal urine would lower the blood pressure nearly to the base-line. Dr. Dixon added that this patient's urine contained 100 times the pressor substance found in normal urine, and that it corresponded closely with the urines of cases he had examined of acromegaly. Extract of posterior lobe was given, at first subcutaneously, but this method had to be abandoned owing to the tendency to superficial necrosis. She showed no increased tolerance to carbohydrates. The presence of the pressor substance showed that the pituitary secretion was in excess. Dr. Turney discussed the case fully, his conclusion being that the patient had a pituitary-sexual-gland syndrome, the lesion being in the posterior lobe of the pituitary. A possible alternative was that there was a temporary failure of the element controlling carbo-hydrate metabolism.

Professor DIXON, F.R.S., detailed his findings in a man the subject of acromegaly of ten years' duration. He had an enormous heart, but no rise of blood pressure. On injecting 1cc of the urine into a cat, the blood pressure went up, and the injection of 5cc caused it to rise to 80mm. The active substance was urohypertensin. The man died suddenly as a result of some extra exertion, and post-mortem the pituitary body was found to be the size of a walnut. The heart weighed about three pounds.

Dr. A. GARROD, F.R.S., gave a description of a case in which myxœdema and acromegaly probably co-existed. The improvement under thyroid treatment left no doubt as to the thyroid defect. The evidence of acromegaly was less conclusive. A skiagram showed enlargement of the sella turcica.

Dr. WILLIAM HILL discussed the best route for operative treatment of pituitary tumor. He did not favor that advocated by Cushing, preferring that followed in submucous resection, and then taking the short, though dangerous, further step. The chief danger was that of wounding the optic chiasma. The Hirsch operation was simpler than that of Cushing, and Mr. Graham and he both found it gave good access to the tumor. He gave a word of warning as to the

dangers of the operation, especially without exhaustive preliminary study.

Dr. LANGDON BROWN discussed the subject, and showed photographs of a case. Mr. RICHARDSON CROSS (Clifton) drew attention to the importance of the inter-relation of the various glands of the body in the economy, particularly ovaries, testes, pituitary, pineal, suprarenals, thyroid, thymus. He had found great benefit from the administration of thyroid and pituitary extracts. Dr. F. E. BATTEN and Dr. GRAINGER STEWART also took part in the debate.



## QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

By H. KÖLLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUTLER, Dresden; and VISSER, Amsterdam.

### SECOND QUARTER, 1912—(*Continued*).

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

#### XI.—LACHRYMAL ORGANS. Reviewed by KRAUSS.

211. FORSMARK. **Dacryocystorhinostomy.** *Klin. Monatsbl. f. Augenheilk.*, April, p. 548.

212. PINILLO. **Dacryocystitis trachomatosa and blennorrhœa of the lachrymal sac.** *Ann. di Ottalm.*, fasc. 4, p. 286.

213. POKROWSKY. **Polyps of the lachrymal sac.** *Ann. d'oculist.*, cxlvii., p. 369.

214. TACKE. **Contribution to the etiology of Mikulicz's disease.** *Ibid.*, p. 90.

TACKE (214, **Etiology of Mikulicz's disease**) observed a bilateral inflammation of the lachrymal glands which was due to a metastasis from a gonorrhœal endometritis. The palpebral lachrymal glands formed tumors about  $\frac{1}{2}$  cm in diameter, which underwent involution without any special treatment. Tacke divides the cases of Mikulicz's disease into three classes: the first due to leucocythæmia or pseudo-leucocythæmia, the second to true tumors, the third to inflammation.

CAUSÉ.

POKROWSKY (213, **Polyps of the lachrymal sac**) found a pedicled polyp in the lachrymal sac of a patient that he

extirpated after it had been treated for a long time for disease. The polyp grew from the posterior wall. The microscopic examination showed it to be a circumscribed proliferation of the mucous membrane caused by a chronic inflammation. Polyps of the lachrymal sac frequently escape observation.

CAUSÉ.

From his findings in various lachrymal sacs PINILLO (212, **Dacryocystitis trachomatosa**) is inclined to believe that trachoma is present in most cases of dacryocystitis. But this does not explain how it is that the great majority of trachomatous patients do not suffer from trachoma of the lachrymal passages.

CALDERARO.

FORSMARK (211, **Dacryocystorhinostomy**) reports thirty cases in which he has performed the following operation: The inner wall of the lachrymal sac is laid bare; its lower part isolated and separated as far as possible. The lachrymal bone is chiseled through in front of the crista and the nasal mucous membrane opened widely with scissors. Then the lachrymal sac is excised below with the scissors directed from below and outward, upward and inward, so as to make the lower opening as large as possible. The lower end of the sac is then fixed in the opening in the bone by means of a loop of thread which is drawn from the lower edge of the outer wall of the sac through the nose and fastened on the cheek. He obtained a good final result in 50% of his cases. The opening in the bone was often too small from the start.

## XII.—ORBITS, INCLUDING EXOPHTHALMOS, ACCESSORY SINUSES. Reviewed by KRAUSS.

215. CHARLET. Optic atrophy and sarcoma of the orbit. *Revue générale d'ophtalmologie*, xxxi., p. 1.

216. DARIEUX. Enucleation in the treatment of panophthalmitis. *Ann. d'oculistique*, cxlvii., p. 180.

217. DENHAENE. A case of voluntary intermittent exophthalmos. *Arch. d'ophtalmologie*, xxxii., p. 370.

218. DUTOIT. Traumatic enophthalmos. *Med. Klinik*, 26, p. 1080.

219. KLOSE, LAMPÉ, and LIESEGANG. A surgical and biological study of exophthalmic goitre. *Beitraege z. klin. Chirurgie*, vol. lxxvii., No. 3.

220. KRAUSS, W., and SAUERBRUCH. Intracranial epidermoid of the frontal region, rupture into the orbit, extirpation, recovery. *Deutsche med. Wochenschrift*, No. 26.

221. SPASSKY. A case of osteoma of the orbit. *Westn. Ophthalm.*, Feb.
222. STENGER. The endonasal treatment of diseases of the eye by recent endonasal operations. *Die Therapie d. Gegenwart.*, 6, p. 261.
223. SULZER and CHAPPE. Tumor of the orbit and of the deep membranes, "Buphthalmos posterior." *Ann. d'oculistique*, cxlvii., p. 365.

DENHAENE (217, **Voluntary intermittent exophthalmos**) gives the clinical history of a very interesting case. A young man, 20 years old, while swimming struck his head against a stake in the bed of the river and injured the lower-outer part of the margin of his left orbit. Afterward he was able to force his left eye far forward by blowing his nose, by sneezing, or by hard straining, but could not by stooping, or by compression of the jugular vein. Ordinarily the exophthalmos of the right eye was 20 degrees, according to Hertel, of the left 18 degrees. The maximal protrusion of the left eye measured from 20 to 30 degrees, that of the right 10 degrees. The vision and ophthalmoscopic condition of both eyes were normal, even during the maximal protrusion. The permanent bilateral exophthalmos was probably caused by venous tumors in the orbit, varices or venous angiomas, while the intermittent exophthalmos may be referred to a lessened power of resistance of the venous walls and of the ligaments in the orbit, due perhaps to trophic disturbances set up by the traumatism.

#### CAUSE.

DUTOIT (218, **Traumatic enophthalmos**) reviews our present knowledge of this subject. The condition is one that appears either at once or a few days after an injury. The traumatism may affect either the orbital ring alone, the eye alone, or both combined. When the orbital ring alone is struck it may be either bruised or fractured, but it is rarely associated with a penetrating wound, or with complicated fractures of the orbit. The blow may be received on a part of the orbital ring which does not break, thanks to certain conditions, but rather transmits the shock partly to the diametrically opposite point, partly to the walls of the orbit, or there may be a fracture at the place of contusion and one also at the diametrically opposite point, or more often of the walls of the orbit. The commonest situation of these fractures is the lamina papyracea. The clinical picture of enophthalmos is accompanied by numerous symptoms, part of which appertain to the fracture

of the orbit and the emphysema, part to the enophthalmos in the narrow sense. When the blow falls upon the eye alone, lacerations of the fasciæ, partial ruptures of the sclera, paresis of the sympathetic with subsequent trophic disturbances, as well as the results of cicatrization and of retrobulbar hemorrhages, take part in the production of an enophthalmos. In the third set of cases, when the blow falls upon both the orbit and the eye, it is not uncommon for the eyeball to be wounded by fragments from the fracture of the orbit.

It is impossible to give a brief and comprehensive review of the work of KLOSE, LAMPÉ, and LIESEGANG (219, **Surgical and biological study of exophthalmic goitre**), although it is of great interest to the ophthalmologist. After an introduction, dealing with the advance of experimental pathology from 1897 to 1908, the authors present the results of their own experimental work, by which they have succeeded in producing this disease in dogs by the introduction of the juice expressed from the thyroid glands of patients suffering from exophthalmic goitre. On the basis of these studies they advance the theory of dysthyroidismus. Then follows a chapter on the clinical hæmatology of Graves's disease, to which is added an experimental portion. Then comes a glance at the way in which biological methods open the way for the investigation of the problems connected with the disease. The work is one that may be strongly recommended to any one who is interested in the study of exophthalmic goitre.

CHARLET (215, **Optic atrophy and sarcoma of the orbit**) gives the clinical history of a case of sarcoma of the orbit of a girl 19 years old, in which the only symptom at first was an atrophy of the optic nerve. The sarcoma remained to a certain degree latent for nine months and, in the absence of all other symptoms, the atrophy was ascribed to a slight albuminuria which was present at the same time. After nine months of observation a protrusion of the eye was noticed, a small tumor was located by examination through the nose and diagnosed a sarcoma. No operation was permitted until six months later. In the meantime the tumor had involved the entire right side of the face and had extended backward to the dura mater. The exophthalmos was so great that the



posterior pole of the eye was in the plane of the frontal bone. CAUSÉ.

SPASSKY'S (221, **Osteoma of the orbit**) patient complained of a tumor at the inner canthus which he had noticed for a year and had recently increased much in size. The eye protruded more than 2cm. The tumor was hard and occupied almost the entire inner canthus. The upper margin of the orbit was irregularly thickened and hard. The conjunctiva of the lower lid and of the lower part of the globe was normal, but the veins above were much dilated. The pupil was slightly dilated, the margins of the disk were indistinct, the veins were distended and dark, the arteries small and bright rose-red. There were many hemorrhages in the fundus. Vision was 0.1. Central absolute scotoma for objects 1mm in size. The functions of all the muscles of the eye were impaired. The septum of the nose was thickened above on both sides. The tumor was removed and proved to be an osteoma. A month later the eyeball had returned to its place. The ptosis, which was quite marked for the first two weeks after the operation, disappeared. The field of vision became normal, the central scotoma disappeared, the fundus became normal, the vision rose to 0.6. V. POPPEN.

SULZER and CHAPPÉ (223, **Tumor of the orbit and of the deep membranes**) give the clinical history of a case of tumor of the orbit with a tumor of the retina and a buphthalmic enlargement of the posterior segment of the globe, met with in an otherwise healthy girl, 5 years old. The trouble had developed within six months. The eye was totally blind. A tumor, having a cystic appearance, two papillary diameters in size could be seen beneath the retina and overhanging the disk. The equatorial portion of the eye was about 6mm larger than the other, while there was no change in the cornea or iris. They find no similar case described, and cannot explain it. It is also uncertain whether the tumor in the eye was an offshoot of the retrobulbar one, or was independent, but they think the former hypothesis the more probable. It could not be determined whether the tumor was a sarcoma, a glioma, or a lymphoma. Treatment with arsenic was instituted on the assumption that it was the latter.

CAUSÉ.

Of late years it has become recognized more and more by both ophthalmologists and rhinologists that the nose and its accessory sinuses have to be taken into account in the etiology of many diseases of the eye. STENGER (222, **The endonasal treatment of diseases of the eye by operations**) emphasizes the fact that many of these diseases which have hitherto been incurable may be cured by proper endonasal treatment. These diseases are excited in the eye by the nose through the lachrymal duct by direct communication, through the anatomical relations of the accessory sinuses to the orbit, and through nervous reflex action. The diseases named which need to be taken into account are: (1) chronic inflammatory diseases of the lids and conjunctiva, including acute and chronic keratitis and epiphora; (2) acute inflammatory diseases of the orbit; (3) diseases of the lachrymal duct and sac; (4) dislocations of the eyeball; (5) diseases of the optic nerve; (6) to a limited degree, glaucoma and cataract. He lays special weight on the early recognition and treatment of purulent disease of the ethmoid. In acute inflammatory diseases of the orbit the surgeon should first determine with certainty the starting point of the disease, and even in acute cases conservative treatment and timely endonasal intervention are always to be considered, while the external opening of the sinuses, including the frontal, is justified only in exceptional cases, and then only when an endonasal intervention does not bring a quickly visible result. In diseases of the lachrymal sac the conditions of the middle meatus, the middle turbinate, and the anterior ethmoid cells are often not taken sufficiently into account. Dislocations of the eyeball by mucocoeles from the frontal sinus and the ethmoid cells come into account, as regards the former, only so far as they are amenable to endonasal treatment. The connection between diseases of the optic nerve and those of the accessory sinuses is very important because of their immediate vicinity and the possibility of direct action, either by pressure or by the transmission of inflammation to the nerve. Timely endonasal treatment, especially the operative opening of the sphenoidal sinus, is of inestimable value in these cases. As regards glaucoma and cataract he believes that he has made a number of clinical observations which deserve proving.

DARIEUX (216, **Enucleation in the treatment of panophthalmitis**) has investigated the question whether the danger of easily setting up a meningitis through propagation of the germs of infection along the sheath of the optic nerve is as great as it has been held to be. Among 210 enucleations within eight years he found 42 that had been done for panophthalmitis. This is the preferable operation in all cases in which the infection entered through a perforating wound, whether a foreign body is present or not. The infectious agent most commonly found was the pneumococcus, in wounds with stones, the bacillus perfringens, and subtilis. The prognosis in metastatic panophthalmitis is bad; three fatal cases were observed. Death was caused in one by a pneumococcal endocarditis, in the others by meningitis, but the latter did not result in either case from the enucleation; it was produced by the same cause that produced the panophthalmitis. Pneumococci were found in one, tubercle bacilli in the other. Darieux concludes that in exogenous panophthalmitis an aseptic enucleation may be performed without danger, and is therefore the operation of choice. In metastatic ophthalmia the operation does not make the prognosis any worse, for it depends altogether on the severity of the general infection.

CAUSÉ.

### XIII.—CONJUNCTIVA. Reviewed by WOLFRUM.

224. ANSELMI. A case of nævus of the caruncle. *Ann. di Ottalm.*, March, 1912, p. 611.
225. BAYER. Pathology of vernal catarrh. *Trans. of the Ophthalm. Society of Heidelberg*, 1912.
226. BOTTERI. Clinical, experimental, and microscopic studies concerning trachoma-inclusion blennorrhœa and vernal catarrh. *Klinische Monatsblätter f. Augenheilkunde*, June, p. 653.
227. BOURDIER and VELDER. A case of papilloma of the lachrymal caruncle. *Arch. d'ophtalmologie*, xxxi., p. 45.
228. BUBLITSCHENKO. Ophthalmia neonatorum and its prevention. *Diss.*, St. Petersburg.
229. COLOMBO. Gonococcus serum in the treatment of gonococcal conjunctivitis of infants and its method of action. *Klin. Monatsbl. f. Augenheilkunde*, April, p. 385. *La Clinica Oculistica*, June, p. 979.
230. FROMAGET, CAMILLE and HENRI. Rare form of staphylococcal conjunctivitis. *Ann. d'oculistique*, cxlvii., p. 298.
231. GABRIÉLIDÈS. Vernal catarrh. *Arch. d'ophtalm.*, xxxi., p. 156.



232. MEYERHOF. Vernal catarrh in trachoma, and family vernal catarrh. *Klin. Monatsbl. f. Augenheilkunde*, June, p. 641.

233. RUATA. Trachoma and gonorrhœa. Studies concerning the presence of specific amboceptors in the blood of persons with trachoma, and their relations to the blood of persons immunized to gonococci. *Rivista Italiana di Ottalm.*, January, 1912, p. 3.

234. SOKOLOFF. Three cases of neoplasms of the conjunctiva bulbi. *Westn. Ophthalm.*, Jan., 1912.

RUATA (233, **Trachoma and gonorrhœa**) states that trachomatous antigen in alcoholic and watery extract never deviates the complement in serums taken from trachomatous persons. Hence he concludes that trachoma is a local affection which does not cause the formation of specific amboceptors in the blood. The pathogenic factor of trachoma has neither an affinity for, nor any relation to, that of blennorrhœa, as is proven by the total inactivity shown by the trachomatous antigen to specific amboceptors which exist in those who are immunized to the gonococcus.

CALDERARO.

BOTTERI (226, **Trachoma-inclusion blennorrhœa and vernal catarrh**) investigated the inclusions in the different forms of trachoma. He finds that inclusions are not constant and, when present, are not in proportion to the severity of the disease. The infectiousness of the trachoma virus is destroyed after a comparatively short time, whether it is kept dry or moist. When kept moist at a temperature of 43° it loses its infectious power in about three hours. These facts were proved by experiments on monkeys. Botteri found a very few inclusions in two cases of vernal catarrh out of eleven that were examined; inoculation with these proved negative. He considers the inclusions found in different diseases to be morphologically identical, but biologically different.

According to BUBLITSCHENKO (228, **Ophthalmia neonatorum and its prevention**), gonorrhœal conjunctivitis is a disease of the upper layers of tissue. The gonococci are found for the most part in the upper and middle layers of the epithelium and penetrate into the adenoid layer only in exceptional cases. During the first days the symptoms of destruction of the epithelium are decidedly preëminent, but regeneration begins at the end of the first week. The infiltration of the adenoid layer consists chiefly of plasma cells. Although the



number of mast cells constantly increases, yet the plasma cells are in the majority, except that in the later stages the mast cells become movable and penetrate to the surface. Eosinophile cells play no part in gonorrhœal conjunctivitis. A proliferation of blood-vessels is to be seen in the adenoid layer. The conjunctiva of the infant is not sterile even in the first few minutes after birth, yet agents are found more often on the margin of the lid than on the conjunctiva itself. Prophylaxis depends on a combination of mechanical and chemical means for disinfection. Neither silver nitrate, protargol, nor sophol can be regarded as a specific; much depends on the way in which the drug is used. It is better to cleanse the eyes with weak antiseptic solutions, or with such as are absolutely non-irritating. He obtains the best results with a 1 to 6000 solution of sublimate.

V. POPPEN.

COLOMBO (229, **Gonococcus serum in the treatment of ophthalmia neonatorum**) has used gonococcus serum in eight cases of gonorrhœal ophthalmia neonatorum, in addition to the usual cleansing with 1 to 5000 solution of sublimate, followed by an application of a 1 or 2% solution of silver nitrate to the conjunctiva. After the application of the silver he drops the serum in the conjunctival sac. The results he says were excellent, for in the cases in which the serum was omitted recurrences of varying severity took place. The reverse procedure, to omit the silver and use only the serum, Colombo could not decide to try, because the efficiency of the serum is not yet sufficiently known.

MEYERHOF (232, **Vernal catarrh**) has seen forty-nine cases of vernal catarrh, and found symptoms of trachoma present in twenty-five of them. Under certain circumstances the differentiation may be very difficult and possible only with the microscope. Only two points are positively diagnostic: the elastic nature and the eosinophilia of the secretion. The author also reports the occurrence of vernal catarrh in five families and considers that there must be in many cases a congenital predisposition to the disease.

BAYER (225, **Pathology of vernal catarrh**) questioned whether the improvement often obtained in vernal catarrh by bandaging the eyes depended on the exclusion of the rays of light,

or upon some other effect, so he covered the eyes with watch crystals, or with perfectly transparent celluloid capsules, applied so as to prevent the access of air, and found that the proliferations at the limbus disappeared under this dressing. This result was attained regularly with every eye as often as desired, but the improvement lasted only as long as the air was absolutely excluded. The eosinophilia of the secretion abated along with the clinical symptoms. He concludes that vernal catarrh is not purely a disease of the lids, but that contact with the air plays an important part in its etiology. In addition he describes some characteristic symptoms, such as the hitherto little known Trantas point, and a peculiar formation of cysts in the limbus, which have also been found sometimes in cases of vernal catarrh that have recovered and points out the diagnostic importance of this symptom in the cases in which trachoma also is present.

KR.

GABRIÉLIDÈS (231, **Vernal catarrh**) saw during the winter a typical keratitis without the conjunctival symptoms of vernal catarrh. The attack came on after using the eyes in winter sports during a very clear day, and he thinks this fact favors the hypothesis of damage done by the chemically acting rays of the solar spectrum. He has noticed several attacks of vernal catarrh in the same family, so is inclined to think that the disease is of infectious or parasitic origin. Finally he describes a bacillus which he found on examination of the fresh secretion.

CAUSÉ.

FROMAGET (230, **Rare form of staphylococcal conjunctivitis**) saw a case that resembled clinically one of Parinaud's conjunctivitis. The disease occurred in one eye of a woman 50 years old. A number of miliary, follicular abscesses appeared in the lower transition fold with simultaneous infiltration of the preauricular gland. The staphylococcus alone was found bacteriologically. Treatment was confined to bathing with boric acid solution. Recovery took place without complication in a few weeks.

CAUSÉ

BOURDIER and VELDER (227, **Papilloma of the lachrymal caruncle**) excised a papilloma of the caruncle from a woman 59 years old, which had been growing slowly for several months.

The tumor was as large as a small pea, and was attached by a pedicle to the region of the caruncle, which formed a portion of the tumor. It exhibited the typical papillomatous structure, with slight inflammatory changes. Only five cases of papilloma of the caruncle have been described.

CAUSÉ.

ANSELMi (224, **Nævus of the caruncle**) reports a case in which examination showed that the nævus cells came from the epithelium, either through detachment of areas of epithelium, or from isolated epithelial cells. The migration of the detached epithelial cells, which have become nævus cells, into the connective tissue is to be ascribed to the slow locomotion of these young elements. In the region of the nævus the connective and elastic tissue is destroyed by the pressure of the nests of nævus cells. The pigmentation in the nævus cells is rather capricious and does not seem to depend on any distinctly demonstrable factors.

CALDERARO.

Little is known as yet concerning the etiology of congenital tumors of the conjunctiva bulbi, in spite of the fact that many have been described, and these cases are quite rare, so that SOKOLOFF (234, **Neoplasms of the conjunctiva bulbi**) was able to observe only three in the course of four years. He concludes that these tumors, which commonly appear clinically to be lipomata, usually prove histologically to be lipodermoids; the cutaneous elements play a small part in congenital tumors and often can scarcely be found. The tumors at the outer canthus are a special kind of teratoid neoplasms, of which the localization and the formation of glandular tissue are characteristic.

#### XIV.—CORNEA AND SCLERA. Reviewed by WOLFRUM.

235. BIOLETTI. Amputation of the anterior segment of the eye. *Ann. di Ottalm.*, 1912, fasc. 3, p. 152.

236. GRUNERT. Operative treatment of keratoconus. *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

237. MONESI. Contribution to the study of congenital staphyloma of the cornea and iris. *Ann. di Ottalm.*, 1912, fasc. 1, p. 76.

238. SIEGRIST. Etiology of keratoconus. *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

239. URIBE Y TRONCOSO. A case of epithelial dystrophy of the cornea. *Ann. d'oculistique*, p. III.



240. VALOIS and LEMOINE. Burn of the cornea with acetone and acetic acid. *Recueil d'ophtalm.*, xxxiii., p. 318.

241. VERDERAME. Sensibility of, and the nerve endings in, the cornea of infants. *Trans. of the Ophth. Soc. of Heidelberg*, 1912.

242. VERDERAME, F. Keratomycosis aspergillus. A clinical and experimental contribution. *Ann. di Ottalm.*, 1912, fasc. 4, p. 223.

243. WIRZENIUS. Iontophoresis in the treatment of diseases of the eye, especially of *ulcus serpens corneæ*. *Finska laekaresällskapets Handlingar*, 1912, vol. xlv., No. 4.

VERDERAME (241, Sensibility of the cornea in infants) showed in a former paper that the normal sensibility of the cornea, aside from individual differences, increases distinctly from the fourth month and becomes almost always perfect by the sixth or tenth month. He has now tried to determine whether the marked difference in the sensibility in infants and adults is due to a difference in the anatomical construction, *i.e.*, to the stage of development, of the corneal nerves and their terminal filaments. The results of his investigations seem to show that there is no such anatomical difference, but that the lack of sensibility is rather due to the as yet incomplete function of the central nervous conduction.

KR.

SIEGRIST (238, Etiology of keratoconus) had observed that patients with keratoconus were usually delicate, nervous people who often suffered from dry skin, falling out of the hair, defective memory, and imperfect perspiration. He therefore made accurate examinations of the blood of nine such patients. None of them had chlorosis or anæmia. The amount of hæmoglobin and the number of red blood corpuscles were normal, sometimes increased. Two findings were striking: a marked lymphocytosis and an accelerated coagulation of the blood. This condition of the blood, when associated with the nervous symptoms mentioned above, is characteristic of the clinical picture known as hypothyroidismus, depends upon a faulty function of the thyroid gland, and is known in its extreme form as myxœdema, or cachexia strumipriva. Whether we have to deal with true hypothyroidismus in cases of keratoconus, or with functional disturbances of other glands with internal secretion Siegrist could not positively determine. Points in favor of the former are



that many of the patients had goitre, and most of them came from Berne, where goitre is endemic. Still hypothyroidismus can be regarded only as the predisposing cause, while the actuating factor that produces the characteristic corneal lesion remains unknown.

KR.

GRUNERT (236, **Operative treatment of keratoconus**) first applies the galvanic cautery from the upper limbus to the apex of the cone, making the burn from 2 to 3mm broad above and tapering it to a fine line at the apex. Forty-eight hours later he removes the eschar and incises the cornea along the entire length of the burn with a narrow knife. He then transplants a flap of conjunctiva with a double pedicle according to Kuhnt's method, which covers the middle line for a breadth of from 5 to 7mm. Four weeks later he transplants back the lower half of the flap that is not adherent. The part that adheres to the burned line he leaves to atrophy, or, when it is so thick as to be unsightly, it may be removed after another four weeks. He has performed this operation on eleven eyes with good results.

URIBE Y TRONCOSO (239, **Epithelial dystrophy of the cornea**) observed a case of this nature in a woman 30 years old, in whom it had started the previous year without known cause. A gray white opacity in the epithelium covered the lower two-thirds of the cornea. With the loupe it could be seen to consist of white points over which the surface was slightly uneven, as in glaucoma. The tension was normal. The eye was highly myopic, still retained good vision, and had a normal fundus. In the thirteen cases observed by Fuchs hypertony was always present and the disease usually attacked one eye of elderly persons. The course is very slow, the eye is always free from signs of inflammation, and the final, permanent result is a gray opacity between the epithelium and Bowman's membrane in the center of the cornea. No efficient method of treatment is known.

CAUSÉ.

VERDERAME (242, **Keratomycosis aspergillus**) reports a case of keratitis due to *aspergillus fumigatus* in a boy 16 years old, who had been struck in the eye by a piece of stone. There was a slight degree of lachrymation and photophobia, pericor-

neal injection, paracentral infiltration of the cornea of a gray white color as large as the head of a pin, surrounded by a double opaque ring. There was a trace of hypopyon and some hyperæmic cysts. The lachrymal passages were intact. The microorganism present was found by culture.

CALDERARO.

WIRZENIUS (243, **Iontophoresis in the treatment of diseases of the eye**) treated eleven cases of trachoma with iontophoresis, using a solution of cupric sulphate and the electrode of Wirtz. His results were in no respect any better than those obtained by the usual methods of treatment. The good results obtained in pannus, blepharitis, episcleritis, and hordeolum, could not be ascribed with certainty to the method. A strikingly beneficial effect was obtained in hypopyon keratitis with a  $\frac{1}{2}\%$  solution of zinc sulphate and Wirtz's electrode. A cure was brought about in six out of twelve cases, improvement in two, while in four the disease was not influenced to any noticeable degree. Among the cured cases were two with very large corneal ulcers and considerable hypopyon.

GROENHOLM.

VALOIS and LEMOINE (240, **Burn of the cornea with acetone and acetic acid**) saw an extensive burn of the cornea by a mixture of acetone and acetic acid in which the epithelium was almost totally exfoliated. The conjunctiva bulbi also was burned, which gave rise to a considerable secretion. Complete recovery took place within a few days as the burn was only superficial.

CAUSÉ.

Amputation of the anterior segment of the eyeball may be performed, according to BIOLETTI (235, **Amputation of the anterior segment of the eye**), only for the purpose of introducing an artificial eye. It is contra-indicated as a means of prophylaxis against sympathetic ophthalmia. It should be performed only when the eye is free from signs of pus, is neither hypotonic, nor atrophic, nor the seat of bony degeneration, and when no symptoms of sympathetic trouble are present. The only case in which it is permissible on a painful eyeball is in one of absolute glaucoma.

CALDERARO.

MONESI'S (237, **Congenital staphyloma of the cornea and iris**) patient, a boy 17 years old, had a staphyloma of the iris and cornea of his right eye. An opacity of the cornea was congenital; when he was 10 years old the leucoma began to become ectatic and the eyeball to enlarge. The anterior segment of the eyeball was amputated because of recurrent attacks of glaucoma. Examination of the amputated piece showed that during intrauterine life the eye suffered from a severe inflammation. This probably occurred during the final months, as otherwise a microphthalmos would have been caused. The inflammation had induced anterior synechiæ of the iris, changes in the structure of the retina and of the ciliary body, the formation of a cyst in the iris and ciliary body, and changes in the structure of the cornea.

CALDERARO.

XV.—IRIS AND PUPILS. Reviewed by NICOLAI.

244. BRADBURN, A. A. **Acute plastic iritis markedly benefited by antistreptococcic serum.** *Ophthalmoscope*, Jan., 1912.

245. GILBERT. **Herpetic diseases of the uveal tract.** *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

246. DE LAPERSONNE. **Ocular sporotrichosis.** *Riv. Italiana di Ottalm.*, Jan., 1912, p. 17.

247. MAX, W. **Atrophy of the iris and epibulbar carcinoma in xeroderma pigmentosum.** *Klin. Monatsbl. f. Augenheilkunde*, June, p. 750.

248. UTHOFF. **A case of very marked persistent pupillary membrane in both eyes.** *Med. sect. d. schles. Gesellsch. f. vaterl. Kultur*, Feb. 16, 1912.

249. VERREY. **A case of unilateral mydriasis of dental origin. Late cutting of the wisdom tooth.** *Ann. d'oculistique*, cxlvii., p. 189.

VERREY (249, **Mydriasis of dental origin**) observed in a woman 34 years old a mydriasis of one eye which was caused by the late cutting of the third molar, or wisdom tooth. This tooth normally appears between the 20th and the 25th years, and the associated troubles are the greater the longer its cutting is delayed. The mydriasis disappeared by the day following the extraction of the wisdom tooth. The eye was otherwise not involved. The dilatation of the pupil was probably caused by a spasm of the dilatator excited by an inflammatory irritation of the trunk of the sympathetic.

CAUSÉ.

GILBERT (245, **Herpetic diseases of the uveal tract**) de-



scribes a peculiar condition of herpes iridis, of which he has seen eight cases, which differs from the ordinary primary and secondary inflammations of the uveal tract met with in herpetic keratitis. Just as herpes corneæ was formerly separated from the group of superficial forms of keratitis, so this "herpes iridis" is to be differentiated from iritides of other etiology by its clinical symptoms. The clinical picture was observed in one case of vitiligo, in one case of neuromyolytic keratitis, in one out of four cases of herpes zoster, and in five out of thirty-one cases of herpes corneæ, thus in about 17% of the cases of herpetic affections of the cornea and skin. The disease of the iris appears in the majority of cases from two to five weeks after the beginning of the affection of the cornea or skin, more rarely synchronously with the keratitis. This involvement of the uveal tract announces itself by severe neuralgic pain, followed in a day or two by hyperæmia, especially of the minor circle of the iris, with one or more hemorrhages from the dilated blood-vessels. The pain then abates. In most cases the disease runs a relatively benign course, passing away in from two to four weeks, and may or may not leave behind posterior synechiæ, but sometimes it is much more serious and may result in occlusion and seclusion of the pupil, so as to render iridectomy necessary.

The patient of DE LAPERSONNE (246, **Ocular sporotrichosis**) had a wound involving the skin and periosteum, the pus from which contained sporotrichosis. She developed an iridocyclitis with multiple gummata of the iris which burst through the capsule of the globe, as in some cases of tuberculosis. The diagnosis could not be confirmed bacteriologically, for no positive cultures could be obtained from the fluid. Hence it may be claimed clinically that an intraocular sporotrichosis may be of endogenous origin. CALDERARO.

UHTHOFF (248, **Persistent pupillary membrane**) reports a case in which the pupillary membrane was very typical in both eyes and so great that the vision was much impaired when the pupil was not dilated. An iridectomy was performed on the left eye, and then a congenital anterior polar cataract was revealed. Some bands of the pupillary membrane together with a little piece of the iris were removed from the right eye. The result may be called good.



MAX (247, **Atrophy of the iris and epibulbar carcinoma in xeroderma pigmentosum**) observed a case of this nature, of which only a single one has hitherto been reported. It is possible that in this case the atrophy of the iris and the epibulbar carcinoma may have been due to the same cause.

BRADBURN'S (244, **Acute plastic iritis markedly benefited by antistreptococcic serum**) patient suffered from pleurisy and neuritis of the arms and legs, together with a bilateral plastic iritis. As iodide and preparations of salicylic acid were of no benefit 10cm of antistreptococcus serum were administered. Improvement followed after a local reaction, and vision again became normal.

XVI.—LENS. Reviewed by NICOLAI.

250. CERISE. **Extraction of the luxated crystalline lens.** *Ann. d'oculistique*, cxlvii., p. 464.

251. HILBERT, R. **Lamellar cataract in four generations of one family.** *Muenchener med. Wochenschrift*, No. 23, p. 1272.

252. KAMBE, T. **A case of expulsive hemorrhage after cataract operation with formation of lacunæ in the optic nerve.** *Klin. Monatsbl. f. Augenheilkunde*, May, p. 543.

253. KAZ, R. **Further experience in the medicament treatment of senile cataract.** *Wochenschr. f. Ther. u. Hyg. d. Auges*, xv., 29, p. 237.

254. PAPARCONE. **Spontaneous resorption of senile cataract with intact capsule.** *Arch. di Ottalm.*, Jan., 1912, p. 499.

KAZ (253, **Medicament treatment of senile cataract**) says that the drops of iodide must be used constantly for years. The combination of iodide of sodium and chloride of calcium recommended by Dors seems to have the same action generally, and is better than iodide of sodium alone in cases of diabetes. Out of twenty-one cases the author has had two failures and two brilliant cases of improvement, so-called cures. The value of this form of treatment needs confirmation by a much larger number of cases, but it seems to be one that may well be tried in the early stages. The danger exists that patients may so rely on this simple form of treatment as to refuse operation at the time when it is indicated.

CERISE (250, **Extraction of the luxated crystalline lens**) recommends a combined procedure when the lens is luxated into the anterior chamber, in which he first performs posterior

sclerotomy to deepen the anterior chamber, and then extracts the lens through a flap incision. He reports two cases in which he has performed this operation, giving useful vision.

CAUSÉ.

KAMBE (252, **Expulsive hemorrhage after cataract extraction**) reports a case of this nature, met with in a woman 81 years old. Several repeated hemorrhages led to enucleation. A hyaline degeneration of the pupillary margin of the iris, similar to that described by others. His explanation is that in an eye, the vitreous of which is very fluid and whose uveal vessels are thickened, the great reduction of tension after the operation causes a vessel to burst. If such a vessel lies in the chorioid the hemorrhage forces the retina and chorioid into the wound, where they are luted together with the iris. In the microscopical examination the nerve fibers of the optic nerve were found to be torn in the papilla, and behind the lamina cribrosa there was an open space into which blood had percolated. Similar conditions have been found in myopic eyes, the so-called lacunar atrophy, and also in glaucoma.

HILBERT (251, **Lamellar cataract in one family**) investigated a family in which lamellar cataract was transmitted through the female members through four generations. There was no consanguinity, rachitis, syphilis, or epilepsy in the family.

PAPARCONE (254 **Spontaneous resorption of senile cataract with intact capsule**) examined an eye that had been enucleated on account of glaucoma and found that a cataract had been absorbed. Investigation of the capsule showed it to be intact, but its anterior epithelium was atrophic. He thinks that the resorption of the cataract depends on the total or nearly total atrophy of the capsular epithelium.

CALDERARO.

#### XVII.—VITREOUS. Reviewed by KÜMMELL.

255. BARTOLOTTA. **Behavior of the vitreous in the presence of a foreign body.** *La Clinica Oculist.*, Feb., March, April, May, and June, 1912.

As the result of his researches BARTOLOTTA (255, **Behavior of the vitreous in the presence of a foreign body**) concludes

that no sort of active reaction on the part of the vitreous gives rise to the formation of tissue. After the introduction of various mechanical and chemical irritants nothing can be observed to indicate any ability on the part of the vitreous to bring about a regeneration of its destroyed tissue. When the primary mesodermal cell elements have reached their full development, and have become transformed into secondary, fibrillary elements, they have lost their power of reproduction and multiplication, a point in which the vitreous differs from other fibrillary tissues. The mature vitreous is unconnected with any tissue that is able to lend it new elements of development; it also contains no embryonal elements that have not yet become developed, therefore it is incapable of inflammation but can react only through degeneration and resorption of its elements. The types of degeneration given are: swelling of the fibrils, the breaking down of the same, and granular degeneration. When this fibrillary degeneration has set in we find in the vitreous as elsewhere currents of leucocytes, the duty of which is to free the tissue of the detritus. These always start from the neighboring membranes especially from the orbiculus ciliaris.

CALDERARO.

XVIII.—CHORIOID. Reviewed by KÜMMELL.

256. FUCHS. Supplement to article on "Sarcoma of the chorioid." *Arch. f. Ophthalm.*, vol. lxxxi., 3, p. 556.

FUCHS (256, **Sarcoma of the chorioid**) has found three more initial forms of sarcoma, and reports two additional cases of necrotic sarcoma of the chorioid in which no trace of living tissue could be found. In cases of necrotic sarcoma a grave iridocyclitis with subsequent phthisis bulbi follows the visual disturbance. As no living tissue was present any longer this may be looked upon as a kind of self cure. Finally he mentions a case of cured glioma of the orbit.

XIX.—SYMPATHETIC OPHTHALMIA. Reviewed by KÜMMELL.

257. FRANKE. The relations of lymphocytosis to injuries of the eye and sympathetic ophthalmia. *Trans. of the Ophthalm. Soc. of Heidelberg.*

FRANKE (257, **Lymphocytosis and injuries of the eye**) instituted researches concerning the lymphocytosis in fifty



cases of fresh and old serious injuries of the eye and comes to the following conclusions. (1) Lymphocytosis may be found in fresh serious wounds of the eye, both in those that may lead to sympathetic inflammation and in those that heal absolutely without irritation. (2) The same blood changes may be present in perforating wounds of the cornea as in severe contusions which never lead to sympathetic ophthalmia. (3) Lymphocytosis may be found in a large number of old severe injuries, in which the wounded eye has been perfectly quiet for years and the onset of sympathetic ophthalmia can scarcely be expected. (4) The absence of lymphocytosis in old injuries furnishes no security against the later onset of a fresh inflammation in the wounded eye. (5) The presence and absence of lymphocytosis in grave perforating wounds of the eye is of no diagnostic or prognostic value, as regards the onset of a sympathetic inflammation. KR.

#### XX.—GLAUCOMA. Reviewed by KÜMMELL.

258. ARLT. A new method of treatment of glaucoma with pilocarpin and dionin. *Wochenschr. f. Ther. u. Hyg. d. Auges*, Nos. 20 and 21.

259. BETTREMIEUX. Curative and preventive sclerectomy in glaucoma. *Ann. d'oculistique*, cxlvii., p. 21.

260. ELLERBROEK. The final result of iridectomy in glaucoma simplex. *Inaug. Diss.*, Goettingen, 1912.

261. ELLIOT. Sclero-corneal trepanation for secondary glaucoma in cataract and other diseases. *The Ophthalmoscope*, May, p. 244.

262. GILBERT. Operation for glaucoma simplex. *Trans. of the Ophth. Soc. of Heidelberg*, 1912.

263. KNAPP. Influence of massage upon the normal and glaucomatous tension of the eye. *Klin. Monatsbl. f. Augenheilk.*, June, p. 691.

264. MAGITOT. Pathological study of glaucoma. *Ann. d'ocul.*, cxlvii., p. 241.

265. SCHNAUDIGEL. Elliot's trepanation for glaucoma. *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

266. TERSON. Hemorrhagic glaucoma and anterior sclerectomy. *Annales d'oculistique*, cxlvii., p. 81.

ARLT (258, Treatment with pilocarpin and dionin) places 2mg of powdered pilocarpin in the conjunctival sac, and eight minutes later 5mg of dionin, keeping the lachrymal passages closed by pressure. The interval of time between the introductions of the two drugs is to permit them both to reach their maximal effect at the same time, as dionin acts much



more rapidly. This procedure is repeated after three or four days. Then a 2 or 3% solution of pilocarpin is instilled every three hours until the increase of tension has disappeared. After about a week an instillation once or twice a day of a weaker solution of pilocarpin will usually suffice; this has to be continued for several weeks.

KNAPP (263, **Influence of massage upon the tension**) finds that, as a rule, no effect is obtained on the tension by massage in the various forms of glaucoma; occasionally it increases the tension. Still for weeks after an eye has been operated on for glaucoma the tension may be reduced in this manner, but the reduction disappears again in from quarter to half an hour. Knapp believes that conclusions can be drawn from the more or less good result as to the filtration of the scar, and so concerning the prospects for success of the operation.

ELLERBROEK (260, **Iridectomy in glaucoma simplex**) gives the results obtained in the clinic at Goettingen. Seventy-seven eyes were taken into account. Thirteen were blind. In twenty-four the vision slowly failed in the course of years. This slow decrease was credited to the iridectomy. Twenty-five eyes remained unchanged. Nothing could be stated concerning the final result in the remaining thirteen because the period of observation was too short. A rapid failure of vision occurred in none of the eyes operated on.

GILBERT (262, **Operation for glaucoma simplex**) claims that the fear of an early impairment of the vision after operation on advanced glaucoma simplex is well based only in exceptional cases in which the tension is relaxed, or nearly so, but does not exist when the tension is high for any reason. The loss of function follows not only iridectomy, but iridotaxis, sclerotomy, trepanation, and cyclodialysis, and therefore depends not on the operation, but on the prompt regulation of tension. In order to avoid these mishaps one must be very careful in the choice of patients, as well as of the operation to be performed. He considers sclerotomy the best.

KR.

SCHNAUDIGEL (265, **Elliot's trepanation**) emphasizes the advantages pointed out by Elliot, and claims the principal one to be that the operation may be performed repeatedly on the same eye until the desired result is obtained. The

postoperative astigmatism is slight, and the verdict of intelligent patients, who have been previously subjected to iridectomy and sclerotomy, is favorable to the operation, so far as regards their subjective sensations. Too much cannot be said in favor of the opportunity the surgeon has of adjusting the operation to meet the needs of the individual case. The danger of letting the trephined disk fall into the anterior chamber can be avoided by removing the trephine while the disk is still attached by a part of its periphery to the sclera, seizing it with forceps and cutting it free with scissors. The iris is either not at all affected, or its root is very slightly held in the aperture so as to cause a little distortion of the pupil. If the incarceration is such that it can be done, a portion of the iris may be excised at its root, preserving the sphincter; if a prolapse of the iris occurs, it may be excised, leaving a coloboma. Care in using the trephine and in the removal of the disk gives the further advantage that the aqueous may be allowed to escape quite slowly, and thus the danger of hemorrhage may be avoided. The danger of causing a traumatic cataract may also be avoided by not letting the trephine enter the eye. Two cases are reported by the writer: the first one of traumatic glaucoma with luxation of the lens and ulceration of the cornea in which iridectomy, sclerotomy, and cyclo-dialysis had failed to give relief in the course of three years. After trephining, the tension improved, the ulceration healed, photophobia and lachrymation disappeared, and at the end of five months the patient remained without trouble. The other case was one of malignant glaucoma in which the left eye had grown worse in spite of iridectomy and sclerotomy, and the right eye was very hard in spite of two sclerotomies. In the latter two trephinings were of only transient benefit. Then a double trephining, with a bridge *imm* broad between the two apertures, succeeded in reducing the tension. This operation can be repeated in case of another attack. The tension of the left eye was also brought back to normal by trephining.

K.R.

According to ELLIOT (261, *Sclero-corneal trepanation for secondary glaucoma in cataract and other diseases*), the onset of secondary glaucoma in senile cataract is not dependent on advanced age; for the most part it occurs in persons with

neglected cataract. He prefers above other measures trephining in all cases which come under observation immediately after the onset of the glaucomatous symptoms, provided that the lens is not fluid, in which case a small iridectomy is indicated. The disease was brought to a standstill in three cases of glaucoma in an aphakic eye, in a leucoma with increase of tension, and in fourteen cases of staphyloma; the tension was reduced and the staphyloma flattened.

GILBERT.

BETTREMIEUX (259, **Curative and preventive sclerectomy**) recommends the simple, pericorneal sclerectomy which he considers to surpass iridectomy in simplicity and certainty of effect in many cases. He maintains that the second eye is always endangered when the first is affected, and that therefore sclerectomy should be performed upon it as a prophylactic measure.

CAUSÉ.

TERSON (266, **Hemorrhagic glaucoma and sclerectomy**) claims that enucleation can be avoided in most cases of hemorrhagic glaucoma by a suitable combination and variation of the older and newer methods of operative and medicinal treatment. The variety of the clinical symptoms and the gloomy prognosis mark this as one of the worst diseases of the eye, and it generally happens that such serious troubles are present in the general organism that the prognosis here is no less grave. Often the anterior chamber is relatively deep, the pupil only slightly dilated, and the iris but little swollen. V. Graefe advised against iridectomy in these cases and Panas says that the only possible operation is enucleation. Yet in many cases a painless eyeball may be saved by repeated sclerotomies with simultaneous medication with dionin in substance. Pilocarpin and abstraction of blood are also of good effect, but this is not true of eserine and hot compresses. He reports a case in which an anterior sclerectomy had the best effect.

CAUSÉ.

MAGITOT (264, **Pathological study of glaucoma**) gives the results of his anatomical examinations of four eyeballs with infantile glaucoma. Three of the eyes were taken from two children, 2 and 13 months old, and the study of these is of



special value because in them could be seen buphthalmos in its commencement. In most of the cases that have been described secondary and primary lesions could not be separated and therefore they could not contribute much toward our knowledge of the pathogenesis of infantile glaucoma. It is worthy of note that both children died shortly after the operation, although little chloroform had been given, probably because of an insufficient antitoxic function of the liver. The fourth eye was taken from a woman 21 years old. In all four cases the buphthalmos dated back to birth. Inflammatory signs could be detected in each, ranging from slight endophlebitic changes in the ciliary veins to complete involvement of the uveal tract with consequent atrophy. Taking into account other cases that have been reported he finds that in almost all inflammatory changes were present: when they were slight, they affected the anterior ciliary system of vessels; when they were more marked, they were to be found throughout the entire anterior ciliary zone, and when still more advanced the entire chorioid was involved. The retina degenerates in consequence of these changes, but is not directly involved as a rule. They are due to endogenous infection, and consist of an endophlebitis with proliferation of the endothelium, which seizes upon by preference the little veins of the anterior segment. Other malformations are very often present. Probably the child is born with the germ in its body, and that the disease develops in the first few weeks. He thinks that the obstruction or absence of Schlemm's canal has no absolute pathogenetic importance. In Case 3 the canal was open, and the inflammatory changes affected only the scleral emissaries. The changes in the vortex veins were not constant, and are not as important as the endophlebitic signs in the anterior segment. Experimental studies on rabbits are not of value because the course of the vessels differs in them from that in man. The experiments of Bartels on the dog seem to be valuable and show that hypertony ensues as soon as the venous circulation in the anterior segment is interrupted, although the posterior veins remain intact and the filtration of the aqueous is not interfered with. This vascular change is of the greatest importance not only in buphthalmos, but also in senile glaucoma. In more advanced cases the vortex veins



finally become involved, and this causes a still greater increase of tension. Magitot divides glaucoma into two classes pathologically: the first with aplasia of Schlemm's canal as a malformation and only trifling inflammatory signs in the anterior scleral emissaries; the second with inflammatory changes of various degrees. Infantile glaucoma differs in its expression from the senile because of the less power of resistance of the capsule of the globe, which causes it to yield before the increased intraocular pressure. None of the secretion theories existing at the present time is able to explain all factors. The production of the aqueous he believes to be an elective function of the retinal ciliary epithelium.

CAUSÉ.

XXI.—RETINA. Reviewed by MEYER.

267. BIRCH-HIRSCHFELD. **Blinding by sunlight.** *Trans. of the Ophthalm. Society of Heidelberg*, 1912.
268. FRENKEL. **Angiomatosis of the retina.** *Ann. d'oculistique*, cxlvii., p. 161.
269. GONIN. **Lymphatic stasis and lymphorrhagia.** *Ibid.*, p. 102.
270. GONIN. **Retinal changes following a fracture of the skull.** *Ibid.*, p. 98.
271. GONIN. **Isolated detachment of a retinal vessel.** *Ibid.*, p. 18.
272. GESILLI, G. **A case of embolism of one branch of the central artery of the retina.** *Riv. Italiana di Ottalm.*, Feb., 1912, p. 31.
273. HOLTH. **A new operative treatment for detachment of the retina and for high myopia. Trepanatio scleræ præ-equatorialis.** *Norsk magazin for lægevidenskab*, 1912, No. 3.
274. ROCHON-DUVIGNEAUD. **Albuminuric retinitis.** *Soc. française d'ophtalmologie*, May, 1912.
275. SIEGRIST. **Tumor formation at the macula.** *Trans. of the Ophthalm. Society of Heidelberg*, 1912.
276. VOSSIUS. **A case of pseudoglioma.** *Ibid.*
277. ZANI. **Retinitis punctata albescens.** *Ann. di Ottalm.*, fasc. I., p. 66.

BIRCH-HIRSCHFELD (267, **Blinding by sunlight**) examined thirty-four cases, fifty eyes, that had been injured by looking at an eclipse of the sun. The fundus was normal in only four. In nineteen there was an enlargement, obscuration, and irregular form of the foveal reflex, in four with a dark brown red discoloration in its vicinity. In two a slight prominence of the foveal patch could be demonstrated with Gullstrand's ophthalmoscope. The changes in the fundus disappeared

completely in eleven cases, in sixteen there developed an irregular pigmentation of the macula with punctate gray spots and lines. No direct connection between the ophthalmoscopic condition and the functional disturbance was present. Vision was perfect in twelve cases, in nineteen it was moderately, in nineteen highly impaired ( $\frac{9}{18}$  to  $\frac{9}{60}$ ). Of the moderately injured eyes eleven regained full vision after a few weeks or months, six improved, and two did not change. Of the highly impaired eyes three recovered, ten improved, six did not improve. Thirty-one of the fifty eyes had a central, nineteen a paracentral positive scotoma, which was always positive at first, but later changed into a relative in many of the cases. The form of the scotoma varied and showed no relation to the form of the disk of the sun at the moment of blinding; its size was usually between  $\frac{1}{2}$  and 1 degree. Together with this positive scotoma there was present in almost all cases a relative central one which extended outward from 5 to 10 degrees and rapidly diminished in size. The demonstration and control of this relative scotoma is valuable prognostically. A closed circular scotoma such as was described by Jess, was not observed. On the contrary, he was able to prove that even in the healthy eye there is regularly a relatively color-blind zone in the upper-inner sector of the visual field, 15 to 40 degrees from the center, in which red appears as yellow, yellow as white, green as gray and blue not saturated. The extent of this zone seems to depend on the position of the eye in the orbit; it is smaller in deep eyes than in prominent ones. The author has found by experiment that the same intensity of light produces greater changes in the darkly pigmented eye than in the albinotic. The essential pathological lesions are destruction of the outer segments of the sensory epithelium, of the outer granules, and of the pigment epithelium, hyperæmia of the chorioid, and transudation into the outer layers of the retina, while the inner layers remain intact. Exclusion of the ultraviolet and ultrared rays did not prevent the onset of typical lesions. Hence it is to be concluded that the luminous rays form the active agent in their production. The concentration of the effect of the luminous rays upon a small, but functionally very important area of the retina is effected by the refraction of the lens and

the absorptive power of the pigment epithelium. Protective glasses should be worn in viewing an eclipse of the sun as they weaken the luminous rays so much that no blinding after-image ensues. KR.

GESILLI (272, **Embolism of one branch of the central artery**) reports the conditions in a case of embolism of the central artery which took place fifteen years before. Examination of the branches of the occluded artery revealed the presence of a slight amount of circulation due either to an incomplete occlusion, or to a canalization of the embolus. The fibrous cord which is accustomed to follow embolic occlusion of the terminal arteries was clinically absent.

CALDERARO.

FRENKEL (268, **Angiomatosis of the retina**) observed a case of this nature from the first in a man 24 years old. The arteries and veins were distended and tortuous and in places could scarcely be distinguished apart; there were several dull red spots, resembling glomeruli of the retinal capillaries, in the peripheral part of the retina. In the course of the disease the artery and vein became distinct at these places. The spots gave the impression of a depigmented retina, were in places surrounded by an edge of pigment, appeared to lie in the level of the retina, and varied in size from that of a point to that of  $\frac{1}{4}$  of the diameter of the papilla. The etiology of the disease is unknown. The first symptom was clouds and muscæ volitantes with perfect vision; in the course of a year and a half the vision was reduced to one-third in each eye. Pathologically the condition was one of angiomatosis of the retina with gliomatous proliferation and the formation of a connective-tissue scale which lay on the chorioid and contained ossification in places. As the first angiomatous glomeruli often lie in the periphery, in these cases the vision remains stationary for a long time and corresponding scotomata can be demonstrated. The ophthalmoscopic picture is characteristic at first, but later loses its clearness. The disease progresses slowly and often ends in secondary glaucoma or hypotony. The prognosis is particularly bad because of its tendency to involve both eyes.

CAUSÉ.

GONIN (269 **Lymphatic stasis and lymphorrhagia**) reports



a sudden attack of this nature in a woman 28 years old. There was an ischæmia of the papillo-macular region; the threadlike arteries could just be seen, the veins were congested and accompanied by a milk-white band on each side, the breadth of which was in some places greater than that of the vessel. The papilla was surrounded by a milk-white cloud with numerous hemorrhages, and there was in addition a large preretinal hemorrhage. The picture changed after a few days. After some weeks the veins were as small as the arteries and the papilla was atrophic. The vision was reduced to perception of light. Gonin thinks that this was a case of simultaneous obstruction to the arterial and venous circulation with engorgement of the lymphatic system of the retina. The often assumed, but seldom found spontaneous hemorrhage into the sheath of the optic nerve will not suffice to explain the obstruction of circulation.

CAUSÉ.

GONIN (270, **Retinal changes following a fracture of the skull**) found fourteen days after the accident about ten milk-white spots in the region of the macula and papilla with a number of punctate and striated hemorrhages in the retina, and two large preretinal hemorrhages. The white spots lay mainly along the course of the veins and were from  $\frac{1}{4}$  to  $\frac{1}{2}$  a papillary diameter in size. The vision was reduced to  $\frac{1}{10}$  by a central scotoma. These changes were found in only one eye. Purtscher's theory is that the white spots are produced by the sudden entrance of the cerebro-spinal fluid into the perivascular lymph spaces of the retina. Its onset in only one eye, as has been observed in three out of four cases, is remarkable. A satisfactory explanation can probably be obtained only from autopsy.

CAUSÉ.

SIEGRIST (275, **Tumor formation at the macula**) describes a tumor-like proliferation in the region of the macula. It was composed of a number of little white globules that were slightly grayish in the center. As a whole it resembled a heap of caviar, except that it was white instead of black. Some of these little white balls floated about in the lower part of the vitreous. The condition was found in a man 28 years old, who was picked up at night in the street suffering from



an attack of apoplexy. Later the patient developed paresis of the right lower facial nerve, paresis of the right arm and leg, motor aphasia, loss of hearing of the right ear, paresis of the right abducens, lowered sensation for pain on the right side, atactic walk, intention tremor, scanning speech, and dementia. Multiple sclerosis is thus clinically suggested, but Siegrist raises the question whether an echinococcus multilocularis in the right eye and also in the central nervous system may not have produced the symptom complex. Siegrist also reports a very unusual case of a white, partly lobulated tumor in the region of the macula of a child 3 years old, who had had the other eye enucleated for glioma two months before. That eye was found to contain a glioma undergoing calcification. The tumor in the second eye remained almost unchanged for two years, and was then observed to be breaking down without any signs of inflammation and atrophy, while the vision improved to 0.6. The question is whether this was really a glioma in the second eye.

ZANI (277, *Retinitis punctata albescens*) reports two cases observed in two out of five children whose parents were not consanguineous. The ophthalmoscopic picture was characterized by innumerable brilliant white spots without any other lesion, while the subjective symptoms consisted simply of hemeralopia without any alteration in the vision, visual field, or chromatic sense.

ROCHON-DUVIGNEAUD (274 *Albuminuric retinitis*) dealt chiefly with the retinitis of pregnancy. Its frequency is one case in 3000 deliveries, or in fifty cases of albuminuria. It appears more often in primiparæ, and comes on in the last four months of pregnancy in  $\frac{7}{10}$  of the cases. The visual disturbance varies from a simple flickering to total blindness. The loss of the reaction of the pupil to light is a particularly unfavorable sign. The local condition of the fundus varies greatly, the classical stellate figure is by no means constant. When the exudates and the papillitis undergo involution the changes left are paleness of the papilla with or without atrophy, sclerosis of the arteries, and spots of pigment corresponding to the primary foci of disease. No improvement can be expected as long as the pregnancy continues. Recovery requires usually about six months; many recover perfectly

but in most a visual disturbance remains. Out of 169 cases nineteen died and twenty became blind through optic atrophy. The most favorable cases were those in which premature labor was induced, which he holds to be absolutely indicated in every case of this nature. He considers the most probable cause to be a changed, toxic composition of the blood due to the nephritis. Improvement of the disease of the retina together with that of the condition of the kidney is quite exceptional in the retinitis due to Bright's disease. The clinical, ophthalmoscopic picture of albuminuric retinitis is by no means constant so the diagnosis cannot be made from it alone. The histological changes consist of dense extensive exudates of fibrin which, as well as the hemorrhages, are to be found in all the layers of the retina. Minute drops of fat are always enclosed in them; whether these are lipoid cells is uncertain. The vascular changes affect chiefly the arteries, the walls of which are thickened, but the veins also become obliterated. These vascular changes are to be found only where changes exist in the retina and are therefore secondary.

CAUSÉ.

VOSSIUS (276, **Pseudoglioma**) describes the microscopical findings in a case of pseudoglioma in a boy 6 months old who at the age of 3 months had had an attack of convulsions with rigidity of the neck and a rise of temperature for one day. On the next day there was a transient paresis of the extremities which passed away and left no trace. Four or five days later the parents noticed a bright reflection in the right eye which had not been inflamed. When brought to the clinic the right eye was blind, unirritated, smaller than the left, the cornea clear, the pupillary portion of the iris pushed forward, the pupil round and held motionless by synechiæ. Behind the lens could be seen a yellowish mass with smooth surface, concave forward, over which ran a branching vessel. The diagnosis was uncertain, but the eye was enucleated for the sake of safety. The child was well and strong. The microscopical examination showed a white, brain-like mass behind the lens which filled the anterior half of the posterior segment of the globe. A slender corn ran back from it to the papilla. The entire pupillary portion of the iris was adherent to the posterior surface of the cornea and had hyaloid stripes

on its anterior surface. The posterior surface of the lens was conical, its capsule intact. No trace of vitreous was present. Behind the lens there was a thin, homogeneous layer of tissue with some pigment and many capillaries which was continuous with the tumor mass and formed in it rings similar to Wintersteiner's rosettes, long gland-like tubes with a mantle of several layers of nuclei and buds of the outer granular layer. The author excludes a commencing glioma and does not consider this to be a pseudoglioma caused by an irido-chorioiditis after meningitis as there were no microscopical signs of an inflammation of the uveal tract, aside from the adhesion of the iris to the cornea, and because no external signs of inflammation of the eye were noticed during and after the peculiar meningitic attack. He thinks it more probable that the case was one of a slight degree of congenital microphthalmos, and that the changes in the pupillary portion of the iris and in the retina were congenital anomalies. He calls special attention to the buds and gland-like tubes which came from the outer granular layer, that on section had a certain resemblance to Wintersteiner's rosettes and may simulate the beginning of a glioma. The explanation of this, according to Pichler, is that when the inner surface of the retina is abnormally fixed the outer granular layer exhibits an abnormal tendency to growth and the formation of buds.

GONIN (271, **Detachment of a retinal vessel**) saw an isolated detachment of a retinal vessel from the papilla in a boy 7 years old, who had been struck in the eye by a stone which had caused an almost complete circular rupture of the chorioid about the papilla, leaving only a short piece on the nasal side. At its upper temporal margin, about a papillary diameter from the margin of the papilla, a vessel could be seen floating free in the vitreous. It had evidently been torn from the central venous trunk by the impact of the blow.

CAUSÉ.

HOLTH (273, **New operation for detachment of the retina**) reports the results of the operation he suggested in 1911, which consists of making a subconjunctival opening in the sclera with a trephine 12mm behind the limbus, usually in the lower temporal quadrant. The chorioid is not injured and the subretinal fluid is not evacuated. The conjunctiva



is sutured over the opening. The patient does not remain in bed as a rule. Since June, 1910, Holth has performed this operation on sixteen eyes, ten with detachment of the retina, and six with high myopia. The results are remarkable. In the course of perhaps two months the retina becomes partially or wholly reattached, the visual field is enlarged, and the vision improves. In three cases the detachment has remained cured nine, thirteen, and twenty months. In high myopia the operation shortens the antero-posterior axis of the eye and the refraction decreases two, three, or more diopters. The form of the eyeball becomes more spherical and its volume is diminished. This seems to happen only when the sclera is very thin, for in myopia of less than twelve diopters and in emmetropia the refraction is not changed.

GROENHOLM.

XXII.—OPTIC NERVE AND THE VISUAL TRACT. Reviewed by MEYER.

278. BEHR. Contribution to the pathogenesis and pathology of choked disk. *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

279. V. HIPPEL, E. The palliative operations for choked disk. *Ibid.*

280. LENZ. The center of the color sense. *Ibid.*

281. STARGARDT. Pathology of atrophy of the optic nerve in tabes and general paresis. *Ibid.*

STARGARDT (281, Diagnostic value of unilateral choked disk in intracranial diseases) concludes from his researches that the theory of the peripheral beginning of the atrophy in these cases is no longer tenable. The changes in the retina are always secondary and differ in nothing from those produced by other descending degenerations. The retina does not suffer through the paralytic attack and high temperature. The peripheral changes in the optic nerve also are always secondary. The cause of the atrophy is to be sought in inflammatory changes in the chiasm and in the intracranial portion of the optic nerve. In commencing cases of atrophy it may be demonstrated directly that the atrophy of the fibers takes place first in the immediate vicinity of infiltrated septa. The inflammatory process spreads to all parts of the central nervous system lying in its neighborhood. The disease of the olfactorius, of the hypophysis, and of the oculomotorii are especially worthy of mention. The infiltration of the



oculomotor nerves may be recognized clinically in all cases through a more or less marked ptosis. The inflammatory changes are identical throughout with those in the cortex in general paresis, and in the spinal cord in tabes; but on the other hand they agree throughout with the changes in Doehle-Heller's aortitis—the smooth atrophy of the tongue, the hepatitis and interstitial nephritis of paretics, the orchitis fibrosa, the chronic chorioiditis observed by Stargardt in one case of general paresis, the inflammation of the peripheral nerves recently described by Steiner, and finally the inflammatory processes in tabetic arthropathies. Stargardt groups all these processes, including general paresis and tabes, under the term “late syphilitic, not gummatous processes.” As the cause in one of these, the aortitis, has been proved to be the presence of the spirochæta pallida, he believes that the rest are caused by the same agent. He can only conclude from his pathological researches that the spirochætæ are situated at the place of the disease, *i. e.*, in the chiasm and in the intracranial portion of the optic nerve in optic atrophy. This pathogenic germ is able to produce grave gummatous lesions on the one hand, and scarcely demonstrable macroscopically non-gummatous processes on the other, in an analogous manner as that of tuberculosis. It is only necessary to mention as examples of the latter the solitary tubercle of the chorioid, and the chronic tuberculous chorioiditis.

KR.

LENZ (280, **Center of the color sense**) reports two cases of bilateral, central hemianopsia for color, both of which came to autopsy. Color vision was absent in both patients throughout the entire visual field with the exception of a trace in the right lower quadrant, where a relative, badly impaired color vision persisted. In the first patient whose brain was examined there was besides an absolute defect in the left upper quadrant. Vision was perfect, showing the widest dissociation of the sense of space from that of color. The theory of a special center for the color sense, isolated from that for space, is based on such rare findings. In the brain of the second patient there was a large patch of softening on the inner side of the occipital lobe below the visual center in the calcarine, which was intact. In addition there was an alteration of

the central and of the subcortical medulla appertaining to the region of the calcarine, in its lower lip. The medulla of the second brain was permeated with minute foci. Taking all things together he locates the color center in the region of the visual center in the calcarine and concludes that an isolated special center for color does not exist, but that it is in the region of the visual center in the calcarine.

KR.

According to the former researches of BEHR (278, **Pathogenesis and pathology of choked disk**) the current of tissue lymph in the optic nerve passes within the individual bundles of nerve fibers centrally into the cavity of the skull. An escape into the intervaginal space through the pial coat practically does not exist. An engorgement of lymph must therefore develop in the distal portion if the nerve is compressed at any place and will cause an ophthalmoscopically perceptible swelling of the papilla into the yielding vitreous. Choked disk is therefore only the clinical expression of an œdema of the trunk of the optic nerve. In intracranial troubles the place of circular compression lies at the cerebral opening of the bony canal, where the nerve is affected by the increased intracranial pressure. A complete occlusion of the intervaginal space must ensue. The clinical expression of this circular compression is given in the typical concentric contraction of the visual field with relative protection of the function of the axially placed papillomacular bundle. If this compression results in a serious injury of the entire section of the nerve, amaurosis is caused, and then a descending degeneration of the nerve fibers soon follows with replacement of the nervous elements by indifferent tissue. A diminution of the metabolism and of the secretion of the tissue lymph go hand in hand. The decrease of the free tissue fluid naturally causes a diminution of the engorgement, a lessening, and finally a disappearance of the prominence of the papilla, although the causal increase of intracranial pressure has not been changed. In choked disk not due to intracranial causes the place of compression is in the optic canal or in the orbit. The author tries to prove this theory by microscopic sections showing: (1) the formation of depressions on the surface of the intracranial optic nerve at the place of its exit from the

bony canal beneath the duplicature of dura, which can be seen in all florid cases that have not been influenced surgically; (2) degeneration of the peripheral bundles of nerve fibers lying beneath the pia, with normal axial bundles, as evidence of the concentrically acting, fairly uniform pressure exerted upon the periphery by the volume of the enlarged brain; (3) the extent of the oedema in the nerve, which is demonstrable only in the intraorbital and intracanalicular portion and never passes beyond the depression below the duplicature of dura where the nerve passes through the base of the skull; (4) non-inflammatory proliferations of endothelium and great increase of the corpora amylacea in the intervaginal space, which can be explained only by a chronic engorgement of lymph. Their presence therefore proves a total closure of the intervaginal space in the optic canals. The proliferation of endothelium may bring about a complete occlusion of the lumen of the intervaginal space. Such preparations form direct evidence against Schmidt-Hanz's and Schieck's theories, for which free communication into the anterior portion of the intervaginal space is a *conditio sine qua non*. The choked disk that develops from other than intracranial and intra-orbital causes may likewise be explained: The forms that appear in general diseases are due to an overabundant production of free tissue fluid for which the outflow passages are insufficient; those that follow local wounds of the eye are caused by passive retention as the result of the reduction of intraocular tension. Thus we obtain a uniform explanation of all forms of choked disk, which show not the least difference clinically or pathologically, or in their symptoms.

E. v. HIPPEL (279, **The palliative operations for choked disk**) says that the appearance of a bilateral choked disk is an unquestioned indication for surgical treatment, which should be undertaken while the functions are still completely preserved. Radical surgical treatment may be undertaken more frequently than hitherto when the diagnostic puncture of the brain is employed more extensively. At present the treatment of choked disk can be only palliative in the majority of cases. Permanent drainage of the ventricles is not as yet fitted for general use, because of the technical difficulties. Lumbar puncture is contra-indicated when a tumor is probably



present; it is indicated in meningitis and is of assistance to the antiluetic treatment. The dangers of decompressive trephining have become very slight in consequence of the improved technique and the performance of the operation in the early stages. It is better to divide the operation into two parts, because success can be obtained in any cases without opening the dura. Puncture of the corpus callosum (der Balkenstich) may cure choked disk completely, but there are cases in which it is contra-indicated, even when the functions are still normal, but it is the preferable procedure in all really early stages. If it should fail, trephining can be performed at the end of three or four weeks. Both operations are invaluable, neither can supersede the other.

KR.

### XXIII.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.

Reviewed by MEYER.

282. VOSSIUS. **Shot wound of the orbit.** *Trans. of the Ophthalmological Society of Heidelberg*, 1912.

VOSSIUS (282, **Shot wound of the orbit**) reports the case of a boy, 16 years old, who had been shot in the orbit four and a half years before with a rifle. The 6mm bullet had passed through the orbit, crushing, but not wounding the sclera, and had landed in the left ethmoid. A large hemorrhage took place into the vitreous, and had been repeated several times, so as to completely cover a large white surface that was at first visible. The pupil was somewhat dilated, did not respond to light, and the eye was blind. After the absorption of a hemorrhage into the anterior chamber nothing more could be seen of the iris, and no red reflex could be obtained from the fundus. The eye had to be removed on account of irritation of the good one. It was somewhat diminished in size, and had a greenish brown cornea. The microscopic examination showed the cornea to be permeated with minute brownish granules of pigment, which gave a positive reaction of iron. The iris was shrivelled up, its root in contact everywhere with the posterior surface of the cornea, and attached to the cornea by a tissue resembling that of capsular cataract. In the sinus of the chamber lay lumps of pigment which gave a positive reaction of iron. The lens was dislocated outward



and backward and was attached to the inner wall of the globe by a pigmented exudate. The exudate had developed from an extensive destruction of the chorioid which corresponded to the white surface covered with blood in the fundus. In addition there was a cord running from the lens forward and outward to the ciliary body, which came from the distorted ciliary processes. The lens was small, nearly spherical, contained masses of lime, and showed a marked folding of the capsule with capsular cataract in two places. The anterior part of the retina was torn loose from the inner wall of the globe, was degenerated, and lay massed together in the back part of the eye, adherent by an exudate behind the lens.

### THIRD QUARTER, 1912.

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

#### I.—GENERAL OPHTHALMIC LITERATURE. Reviewed by WESSELY.

(Books, Monographs, and Historical Essays.)

283. ADAM. *Ophthalmoscopische Diagnostik an der Hand typischer Augenhintergrundsbilder.* 232 pages with 48 plates. Berlin, 1912.

284. JACKSON, EDWARD. *A supervised and systematic study of ophthalmology.* *Ophthalmic Record*, Sept., 1912.

ADAM'S (283, *Ophthalmoscopic diagnosis*) work is of special interest because based in many ways on the methods and teaching of v. Michel. The relations of ophthalmic to general diseases are brought strongly to the front, while the ophthalmoscopic symptom, rather than the whole clinical picture, is adopted as the basis of classification. The primary object of the book is to serve as a systematic guide for students in the making of diagnoses, so the numerous plates, which well entitle the book to be called an *Ophthalmoscopic Atlas*, are made to be subservient to the text. It is one to be strongly recommended.

JACKSON (284, *A supervised and systematic study of ophthalmology*) outlines the plan for the training of students in ophthalmology which has been inaugurated in the University of Colorado, somewhat similar to that in the University of Oxford. The student takes a general medical course modified by the elimination of certain subjects that

have no bearing on a general medical education. After receiving his medical degree he has laid out for him a course of reading, clinical work, and demonstrations. If after two years he passes an examination and presents a satisfactory thesis he is given a degree of Doctor of Ophthalmology. Such systematic methods of training would tend to raise the standards of ophthalmic practice, for the present desultory manner in which the young men of this country now attempt to fit themselves as specialists is highly unsatisfactory.

ALLING.

## II.—RELATIONS OF OPHTHALMIC TO GENERAL DISEASES, INCLUDING POISONS. Reviewed by WESSELY.

285. ALEXANDER, E. W. The pathological conditions of the eye secondary to disease of the lymphatics of the neck and throat. *Ophthalmology*, July, 1912.

286. ALTER, F. W. Metastatic purulent ophthalmia. *Ophthalmology*, July, 1912.

287. ARNOLD. Examinations of the urine in phlyctenular diseases of the eye. *Diss.*, Rostock.

288. BANGE. The condition of the eyes after rupture of the liver. *Muenchener med. Wochenschrift*, No. 28, p. 1577.

289. DUPUY-DUTEMPS and LUTEMBACHER. The ophthalmoscopic signs of erythremia. *Annales d'oculistique*, cxlviii., p. 81.

290. FLEISCHER. A peculiar disease hitherto unknown, characterized by tremor, psychical disturbances, brownish pigmentation of certain tissues, especially of the periphery of the cornea, and cirrhosis of the liver. *Dtsch. Zeitschr. f. Nervenheilk.*, vol. xlv., No. 3.

291. GEBB. Is there a toxic action of salvarsan upon the papillomacular bundle? *Med. Klinik*, No. 35, p. 1423.

292. KUMAGAI. A case of paresis of the trochlearis in the course of typhoid fever. *Zentralbl. f. prakt. Augenheilkunde*, Sept.

293. MARMOITON. Visual troubles in ptomaine poisoning. *La clinique ophtalmologique*, vol. iv., p. 450.

294. MOTOLESE. Bilateral papillitis and alternating convergent strabismus in purpura exanthematica rheumatica. *Annali di Ottalm.*, fasc. 5.

295. PERETZ. Abscess of the vitreous originating from a furuncle on the neck of a diabetic woman. Staphylococcal metastasis. Exenteration of the eyeball. Recovery. *Revue gén. d'ophtalm.*, xxxi., p. 289.

296. TRUC. Chronic tuberculo-rheumatic uveitis. *Annales d'oculist.*, cxlviii., p. 31.

ARNOLD (287, The urine in phlyctenular disease) finds the indican in the urine increased by Obermayer's test in 23 out

of 40 cases of scrofulosis, while this was the case in only 4 out of 20 healthy children. Hence he thinks that an abnormal destruction of albumin seems to play an important part in scrofulosis.

TRUC (296, **Chronic tuberculo-rheumatic uveitis**) shows that in many cases a chronic uveitis is an ocular manifestation of a general disease, particularly the one called by Poncet "tuberculous rheumatism." Truc gives the clinical histories of several patients in whom arthritic symptoms had existed for years before the onset of the uveitis, the nature of which was proved to be tuberculous either by the reaction, or by the results of treatment. CAUSÉ.

KUMAGAI (292, **Paresis of the trochlearis in the course of typhoid fever**) saw a paresis of the trochlearis appear in the third week of a mild case of typhoid fever. It passed away entirely in about six weeks.

PERETZ (295, **Abscess of the vitreous from a furuncle of the neck**) observed a grave panophthalmitis start from a furuncle on the neck of a diabetic woman 73 years old. After existing as an abscess of the vitreous for three months it gave rise to glaucoma and the eye was exenterated. It proved to be a metastasis of staphylococci. CAUSÉ.

DUPUY-DUTEMPS and LUTEMBACHER (289, **Ophthalmoscopic signs of erythremia**) describe fully the general morbid symptoms of erythremia, also known as Vaquez's disease and as polycythæmia, which consist principally of an enlargement of the spleen, which is often considerable, cyanosis, polyglobulia from an absolute increase of the red blood corpuscles, increase of the quantity of blood (plethora), and a consequently marked ectasia of the walls of the veins. The quantity of blood is often doubled or trebled. The hyperæmia of the internal organs gives rise to a great many troubles, among which hemorrhages and thromboses are specially mentioned. The changes visible in the eye correspond to the general condition. The authors give the clinical history of a typical case, in which the chief ophthalmoscopic symptom was a considerable dilatation and darkness of the veins while the arteries maintained their normal appearance and caliber. No changes were found on the papilla. In other cases the dilatation of the retinal veins may be so great as to cause

not only tortuosities and varicosities, but also small retinal hemorrhages. In contradistinction to this clinical picture we find ophthalmoscopically in congenital cyanosis all of the vessels to be of normal caliber, and the arterial walls to be preëminently dark, together with a dark discoloration of the papilla.

CAUSÉ.

MOTOLESE (294, **Bilateral papillitis and alternating convergent strabismus in purpura exanthematica rheumatica**) describes a case of rheumatic exanthematic purpura in a child with the following ocular complications: Alternating strabismus, impaired vision of both eyes, bilateral papillitis, and some small retinal hemorrhages in the right eye. The strabismus and neuritis passed away completely after about 20 days.

CIRINCIONE.

ALEXANDER (285, **Pathological conditions of the eye secondary to disease of the lymphatics of the neck and throat**) believes that obscure and recurring inflammations of the eye are often due to soluble toxic products from diseased tonsils and adenoids, or cervical glands, especially in children, and advocates the examination of the throat and operation in these cases. He cites cases that are more or less convincing as proof of his contention.

ALLING.

ALTER (286, **Metastatic purulent ophthalmia**) summarizes our knowledge of this condition as follows: Metastatic ophthalmia when bilateral offers a bad prognosis for life. In unilateral cases the prognosis is better, but the eye is usually lost. The rare cases of the preservation of vision are found in the acute exanthemata and epidemic cerebrospinal meningitis. Asepsis in surgery is the remedy. The streptococcus is the organism most frequently found. His case was unilateral and the eye was enucleated.

ALLING.

FLEISCHER (290, **A hitherto unknown disease**) refers to the cases of greenish pigmentation of the cornea before described by him, in which he has found a greenish brown pigmentation of certain parts of the connective tissue in other parts of the body. The patients display grave nervous and



psychic symptoms, such as marked tremor, diabetes, and conditions of excitement, and were found on autopsy to have cirrhosis of the liver, slight nephritis, and circumscribed leptomenigitis. He has examined the pigment and finds it very like silver pigment by a number of reactions. As there was no ground in the history for a diagnosis of argyrosis, and as the connection with the grave nervous disease is certainly not accidental, a simple argyrosis is not to be thought of, but the case must rather be one of a pigment which is nearly related microchemically to the silver pigment.

BANGE (288, **The condition of the eyes after rupture of the liver**) saw the following ophthalmoscopic condition in a case of rupture of the liver three days after the successful suturing of the liver and removal of enormous quantities of blood from the abdominal cavity. Papillæ slightly hazy with sharply defined roundish yellowish-white spots as large as or larger than the papillæ themselves in their neighborhood. There was no disturbance of function. Complete recovery after about three weeks as the anæmia improved.

MARMOITON (293, **Visual troubles in ptomaine poisoning**) says that the commonest ocular symptom is paresis of the sphincter pupillæ, usually bilateral, with or without simultaneous paresis of the ciliary muscle. In some cases of fish poisoning meiosis is observed as the result of paresis of the sympathetic. Pareses of the extrinsic muscles are very common. Papillitis was noted in one case. Polio-encephalitis superior must be taken into account diagnostically, but this is a chronic form of disease, while in ptomaine poisoning the pareses appear suddenly and tend to recover slowly. In addition to the secondary action of ptomaines and leucomaines we have etiologically to do chiefly with microbic toxins and microorganisms. Prolonged boiling kills most of the microbes, but does not affect the ptomaines and leucomaines. Pathogenetically the disease is probably caused in the milder cases by the action of the poison, or of the microbes, upon the peripheral branches of the nerves, while in the more severe cases the disease is doubtless nuclear. The ocular symptoms usually appear on the day following that of the ingestion of the tainted food. Recovery takes place in 90% of the cases, yet the mortality in botulismus is considerably higher, from

30% to 50%. The previous integrity of the organs is of the greatest importance to the prognosis. A special treatment for the eye should be added to that for the general condition.

CAUSÉ.

### III.—GENERAL AND EXPERIMENTAL PATHOLOGY AND TREATMENT. Reviewed by LOEHLEIN.

297. ANTONELLI. Cranial polyneurites, oculomotor in particular, after treatment with arsenobenzol. *Arch. d'ophtalm.*, xxxii., p. 534.

298. BELLENCONTRE. Contribution to the study of salvarsan in ocular therapeutics. *La clinique ophtalm.*, iv., p. 358.

299. BISTIS. Ocular complications appearing after the use of arsenobenzol and their signification. *Zeitschr. f. Augenheilk.*, xxviii., p. 150.

300. BOURDIER. Experimental sporotrichosis. Iritis and keratitis produced endogenously. *Annales d'oculistique*, cxlviii., p. 48.

301. ERDMANN. Changes in the eye produced by ethyl chloride. *Klin. Monatsblätter f. Augenheilkunde*, Sept., p. 370.

302. IGRSHEIMER, JOS. Experimental researches concerning syphilis of the eye. *Muenchener med. Wochenschrift*, No. 39, p. 2089.

303. KNAPP. The influence of massage upon the tension of the eye. *Ibid.*, No. 38, p. 1814.

304. REESE, ROBERT G. Effects of salvarsan on the eye. *New York State Journal of Medicine*, July, 1912.

305. RUBERT. The etiology of phlyctenular ophthalmia. *Klin. Monatsbl. f. Augenheilkunde*, Sept., 1912, p. 273.

306. SZARDASY. Contributions to the tolerance of the eye to the presence of foreign bodies. *Zeitschr. f. Augenheilk.*, xxviii., Nos. 2 and 3.

307. SCHANZ. Colored hunting, snow, and protective glasses. *Wochenschrift f. Ther. u. Hyg. d. Auges*, No. 45.

308. SCHANZ. Apparatus for the observation of fluorescence in one's own eye and the injury to vision by the fluorescent light. *Ibid.*, No. 43.

309. SCHIECK. The application of the results of the study of immunity to ophthalmology. *Zeitschrift f. Augenheilkunde*, xxviii., No. 1.

310. ZALOZIECKI and FRUEHWALD. Disturbances of the cranial nerves in the early stage of syphilis, especially after salvarsan. *Wiener klinische Wochenschrift*, Nos. 29 and 30.

SCHIECK (309, Immunity and ophthalmology) describes briefly the diagnostic use of tuberculin, Wassermann's reaction, Kuemmell's trial of a serum reaction of sympathetic ophthalmia, and the therapeutic value of diphtheria serum. With regard to the jequirity treatment of trachoma he recognizes that the nature of this was first cleared up theoretically by Roemer, although the practical results were over-estimated at first. He explains the fact that the expectations

from serum treatment of pneumococcal infections of the eye, which rested on a sound experimental basis, were not realized, through the varying virulence and individual differences in different stocks, and the slight degree of metabolism in the cornea. For the latter reason he thinks that the serum, perhaps in larger doses, promises better in post-operative pneumococcal infections than in *ulcus serpens*, as long as the vitreous has not been infected. Regarding Deutschmann's serum he thinks that the occasional clinical results of v. Hippel are not to be ascribed to specific properties, but perhaps to chemical processes. Then follows a brief criticism of Roemer's attempt to influence incipient cataract, which Roemer himself has given up. Finally he speaks of Elschnig's interpretation of sympathetic ophthalmia as an anaphylactic process after absorption of uveal pigment as one that is clinically not very probable.

RUBERT'S (305, **Etiology of phlyctenular ophthalmia**) experiments confirm the results of Wecker, who found that he could induce phlyctenulæ in rabbits that had been infected with tuberculosis by the instillation of tuberculin, but they show on the other hand that the same effect can be produced in tuberculous animals by other poisons, such as the *staphylococcus pyogenes aureus*. No such result is ever produced in healthy animals, even when they have been artificially rendered anæmic. The formation of phlyctenulæ accompanying severe conjunctival irritation appeared only in tuberculous animals, never in healthy ones, no matter whether tuberculin or *staphylococcus virus* was instilled. The phlyctenulæ thus produced showed the usual picture of solid, subepithelial heaps of round cells with the epithelioid cells involved to various degrees. No bacilli could be found in them.

IGERSHEIMER (302, **Syphilis of the eye**) injected mixed and pure cultures of *spirochætæ* into the veins of rabbits, and often produced an acute chorioiditis that quickly and permanently recovered, which he compares with the congenital chorio-retinitis of hereditary syphilis. After a certain period of latency he occasionally saw the onset of iritis, optic atrophy, and diseases of the lids. He also saw a keratitis which resembled clinically a parenchymatous keratitis, but in which *spirochætæ* could not be demonstrated.



BOURDIER (300, **Experimental sporotrichosis**) produced an experimental sporotrichosis with infiltration of the iris and cornea endogenously in a dog. A culture of sporotrichum Beurmanni was injected into the left carotid. Eight days later the first nodules appeared on the nose, ear, and brow and after 21 days the first eye symptoms, consisting of a sluggish iritis, two nodular infiltrations of the iris and the two ends of the vertical meridian, and a diffuse parenchymatous opacity of the lower segment of the cornea which gradually spread over the entire cornea. After a few days a retrogression of all the symptoms began and soon became rapid. In this stage the animal was killed. The microscopic examination showed a total infiltration of the iris, ciliary body, and lower fifth of the cornea with leucocytes. The patches of infiltration on the surface of the iris had formed conglomerates; the deep layers only of the cornea were infiltrated. No polynuclear cells were found; the case was one of infiltration through diapedesis. This experimental sporotrichosis affords numerous analogies with the diseases of the cornea and iris in trypanosoma infection and with the changes described by Elschnig as present in keratitis due to hereditary syphilis. They also prove the possibility of the onset of an iritis and a parenchymatous keratitis in the course of a general infection through the transportation of the infectious germs in the circulation.

#### CAUSÉ.

SCHANZ (308, **Apparatus for the observation of fluorescence in one's own eye**) describes a simple apparatus by means of which it can be demonstrated that the ultraviolet rays of ordinary daylight produce a lively fluorescence of the media of the eye and influence detrimentally the act of vision. As the spectrum of our strong artificial sources of light is materially longer on the ultraviolet side than that of daylight, he maintains that the eye should be protected against these rays. For this purpose he recommends the euphos glass. In a second paper (307, **Colored hunting, snow, and protective glasses**) he points out that hunters have found out empirically that they see better when they wear colored glasses, and prefer the yellow, brown, and green-yellow ones, which absorb many of the ultraviolet rays. But these glasses have the fault



that they obstruct the passage at the same time of many of the visible rays, which is avoided as much as possible by the euphos glass.

ERDMANN (301, **Changes in the eye produced by ethyl chloride**) says that after inhalation or subcutaneous injection of ethyl chloride he has produced in dogs a parenchymatous opacity of the cornea, which is to be ascribed to a lesion of the endothelium and disappears after the endothelium has been regenerated. Injuries of the lenticular capsule also were observed several times.

SZARDASY (306, **Tolerance of the eye to foreign bodies**) reports six cases in which a foreign body remained in the eye after a fruitless attempt to remove it, and caused no reaction, while fair vision was preserved. Such a tolerance to foreign bodies is possible only when a sterile body, which is not acted upon chemically, is encapsuled in a portion of the eye which is poor in fluid.

BISTIS (299, **Ocular complications after the use of arsenobenzol**) believes that the ocular complications that follow the use of salvarsan are not to be ascribed to the remedy, but are to be considered as symptoms of syphilis. This theory is not susceptible of proof in the cases of disease of the uvea following salvarsan, but optic neuritis is not rarely an early symptom of syphilis, so that the explanation of this as toxic is forced, the more so that poisoning of the optic nerve by arsenic is not accustomed to take the form of a neuritis, but to show itself as a retrobulbar disease with a central scotoma. On account of the small number of cases it is difficult to judge concerning the occasional cases of early pareses of the ocular muscles after 606.

ZALOZIECKI and FRUEHWALD (310, **Disturbances of the cranial nerves in the early stage of syphilis, especially after salvarsan**) think that the increase of the early syphilitic nerve diseases since the introduction of the salvarsan therapy is indubitable; yet they do not think that in the majority of cases salvarsan exerts any direct harm upon the cranial nerves. They believe with Ehrlich that such troubles come from surviving spirochætæ that are already in the central nervous system, which may readily escape death with the doses usually given.

REESE (304, **Effects of salvarsan on the eye**) considers salvarsan to be a powerful symptomatic remedy for the treatment of syphilitic lesions of the eye, especially in combination with mercury and iodine. Although its action is more rapid than that of mercury it should not replace the latter, except in selected cases. The intravenous method of administration is best, both for the comfort of the patient, and for quick action. In his opinion salvarsan is contra-indicated in simple, spinal, non-inflammatory atrophy of the optic nerve.

FOSTER.

ANTONELLI (297, **Cranial polyneurites after treatment with arsenobenzol**) reports the following case: An otherwise healthy man 39 years old received an injection of 0.4 salvarsan 2 months after the initial lesion, and after an interval of 14 days another of 0.5. Six days later a peripheral facial paresis appeared on the left side, together with paresis of the right acusticus, paresis of the right abducens, and bilateral papillo-retinitis with flamelike hemorrhages. Finally after 5 weeks a paresis of the right oculomotorius developed. Wassermann was strongly positive. Treatment consisted of small doses of salvarsan, 0.1 twice a week, alternating with intramuscular injections of mercury and 2 grams of potassic iodide daily. The final result was: ptosis, paralytic strabismus, slow reaction of the pupils, slight optic atrophy, and a corresponding impairment of vision, especially of the right eye. Antonelli thinks that this "latent" meningitis was preëminently of syphilitic origin, but yet he believes that the salvarsan had a bad effect, in that by its toxic action on the cranial nerves and the auditory apparatus it formed a locus minoris resistentiæ for the syphilitic virus. This is specially favored by the intravenous injection, which facilitates the meningeal permeability of the salvarsan. Such cases emphasize the good service rendered by the classical treatment and the dangers of the new, which must be used only with care.

CAUSÉ.

BELLENCONTRE (298, **Salvarsan in ocular therapeusis**) has within 15 months made 114 injections, all but two intravenous, in 40 cases of syphilitic eye disease. The symptoms of the secondary stage are not taken into account, because these react well to every antiluetic treatment. The first

doses given were from 40 to 60cg, and were often followed by more or less marked general symptoms which could be reduced to a minimum by the subsequent administration of smaller doses up to 30cg. In none of his cases did he see the condition of the eye grow worse, yet he reports the case of a woman treated elsewhere for secondary syphilis who lost her eye from a very severe neuro-retinitis followed by detachment of the retina. This was the result, as he believes, not of the salvarsan, but of malignant syphilis. Wassermann's reaction was used as a control of all his cases. The interval between the injections of the larger doses was 15 days, of the smaller ones 10 days. Better results were obtained with the larger than with the smaller doses. An interesting point is that he obtained notable results in interstitial keratitis, especially when the cornea was vascularized, in that the second eye remained free from the disease in two cases, which was credited to the treatment. No improvement was obtained in 7 cases of optic atrophy. The result was negative also in pareses of the ocular muscles and hereditary chorio-retinitis. Bellencontre concludes that with improvement of the preparation and more exact knowledge of its action its field of usefulness will be enlarged, as it greatly exceeds mercury in power and quickness of action.

CAUSÉ.

The power of massage to reduce the tension is quite considerable in the normal eye, according to KNAPP (303, **The influence of massage upon the tension of the eye**), but the effect passes off in three-fourths of an hour. The effect on the glaucomatous eye is less constant and of shorter duration.

## BOOK REVIEWS

**XV.—Sclero-Corneal Trephining in the Operative Treatment of Glaucoma.** By R. H. ELLIOT, Lieutenant-Colonel, I. M. S., Madras. Pp. 117. London: Geo. Pulman & Sons, Thayer Street, Manchester Square, West, 1913. Price, 7s. 6d. net.

The appearance of Colonel Elliot's book is surely timely, for rarely has so much interest been aroused by any one operative procedure as trephining in glaucoma. This operation is being tried out in all parts of the world. The views of the one to whom we owe so much for the development of the operation, based upon an experience of 780 cases, demand careful study. An historical introduction to the subject is furnished by the reproduction of two articles from the *Ophthalmoscope*: the first, "The Trephine in the Treatment of Glaucoma," by S. Stephenson, and the second, "The Newer Operations for Glaucoma," by Arthur J. Ballantyne.

Trephining is particularly indicated in chronic glaucoma. One of the earliest cases operated upon was still filtering freely two and one half years after the operation. Though acute glaucoma is unusual in Madras, the author believes trephining is the safest and easiest method. Trephining has given good results in staphyloma, in glaucoma following cataract operation, in adherent leucoma, in glaucoma after injury and in blind, painful eyeballs. Of particular interest is Colonel Elliot's view on prophylactic operation in glaucoma. It is a rule at Madras to trephine both eyes when one is affected with glaucoma.

In the chapter on Technique, all of the operative steps are given in detail. The conjunctival flap is reflected from above; sutures are not necessary. Splitting of the cornea (by means



of a Bowman's needle) is done in every case. The trephine must be applied as far forward as possible to establish a permanent filtering channel. The instrument must be sharp. The size of the trephine opening is best 2mm, though in a recent case the tension may remain very low for a long time, possibly indefinitely. (Cases of extreme hypotony have occurred in the reviewer's practice where they were associated with choroidal detachment.) It is best to excise a piece of iris; this should be done without putting any traction on the iris. Atropin is instilled on the third day.

The other chapters give a description of the various Trephines and treat of the Complications during operations, the After-Management of the patients. A very interesting chapter is devoted to the Diagnosis of Glaucoma in Southern India. The system of keeping records of the glaucoma patients at Madras is very complete. In the final chapter, E. Temple Smith writes on the "Site of Trephining for Glaucoma: its Importance."

We are in Colonel Elliot's debt for giving us in a convenient form the results of his enormous experience. It is to be hoped that the favorable reception which this operation is receiving everywhere will be confirmed by the test of time, for it surely is the simplest and safest operation of those recommended in the treatment of chronic glaucoma.

A. K.

**XVI.—Grundriss der spezifischen Diagnostik und Therapie der Tuberkulose** (The Specific Diagnosis and Treatment of Tuberculosis). By Professor J. PETRUSCHKY, Danzig. Pp. 138. Leipzig, F. Leineweber, 1913. Price, 4 Marks.

Notwithstanding the excellent book of Röpke and Bandelier on this subject, it has seemed to the author not to be out of place for him to publish his observations of over twenty years' experience, because of the growing understanding and interest in the specific treatment of tuberculosis, which is making itself felt among practising physicians. The author has gathered his experience exclusively from ambulatory patients, which is of great advantage, as it permits the following up of a patient for years, and makes possible the determination of a definite cure.

The treatment with tuberculin, after it has been carried on for some months with apparent arrest of the disease, is in many cases followed by relapses. This has suggested to Petruschky his "treatment in stages." On starting a new period of treatment, on account of fresh symptoms, the striking fact presented itself—that the insensitiveness of the patient to tuberculin at the end of the first treatment period was replaced by a renewed sensitiveness. This led to the practice of subjecting every patient to a new test about three months following the end of a treatment period; if a renewed sensitiveness existed, another stage of tuberculin treatment was begun, even if no symptoms were present. In this way definite cures were obtained. The author has furthermore had remarkable success in extending the tuberculin treatment to checking latent tuberculosis when found present by the tuberculin test, in any of the relatives of those severely affected by tuberculosis.

The "treatment by stages," is an extremely suggestive line of thought. The book gives an excellent, clear but brief, description of the specific diagnosis and treatment of tuberculosis, and contains many instructive observations. The great variety of tuberculous lesions in the eye should make the book of value to the ophthalmologist.

A. K.

## MISCELLANEOUS NOTES.

1. The Ophthalmological Society of the United Kingdom holds its first Annual Meeting on April 24 and 25, 1913. On Thursday, both in the morning and afternoon, the session will consist of the reading of papers. On Friday, April 25th, there will be a general discussion on "Vascular and Other Retinal Changes in Association with General Disease." In the afternoon there will be a clinical meeting at the Royal London Ophthalmic Hospital. In the evening there will be a dinner.

2. This year's Annual Meeting of the German Ophthalmological Society will take place in Heidelberg, May 15th, 16th, and 17th. The change in date was made to avoid conflict with the meeting of the International Medical Congress in London. Forty-nine papers are announced, and there are to be twenty-three demonstrations.

3. A new journal has been founded, with the name "Zeitschrift für augenärztliche Optik." This new journal is to appear bi-monthly, and will be edited by Professor Greeff, Dr. Oppenheim, and Dr. von Rohr. The publisher is J. Springer, in Berlin. The subscription price is 9 Marks per year. The journal will be devoted to optics and ophthalmic instruments.

4. There will be a special meeting of the Belgian Society of Ophthalmology, August 2 and 3, 1913, in Ghent (Belgium). Notice of any communications should be sent to Professor van Duyse, 65, rue Basse-des-Champs, Ghent (Belgium), before June 15, 1913. There will be at the same time a Universal Exhibition at Ghent.

5. **Announcement of a Prize in Ophthalmology of 5000**

**Frans.** Thanks to the liberality of an anonymous philanthropist, a prize of 5000 francs will be bestowed in 1914 to the best work treating of the etiology, prophylaxis, and treatment of forms of iritis, irido-cyclitis, or cyclitis which are not due to syphilis.

Only those papers are to be admitted to the competition which have been presented to one of the ophthalmological societies in France or in foreign countries. The jury shall consist of three members chosen from the oculists connected with the principal ophthalmic hospitals in Paris. The papers must be typewritten or printed in French, English, or German, and must be received not later than August 15, 1914, at the office of the *Annales d' oculistique*, 26 Boulevard Raspail, Paris, France.

6. A new society has been formed in Louisville, which is to be called the "Louisville Eye, Ear, Nose, and Throat Society." The meetings are to be held once a month. Dr. Pfingst has been elected President; Dr. W. J. Leach, of New Albany, Vice-President; and Dr. Roy Peabody, of Louisville, Secretary and Treasurer.



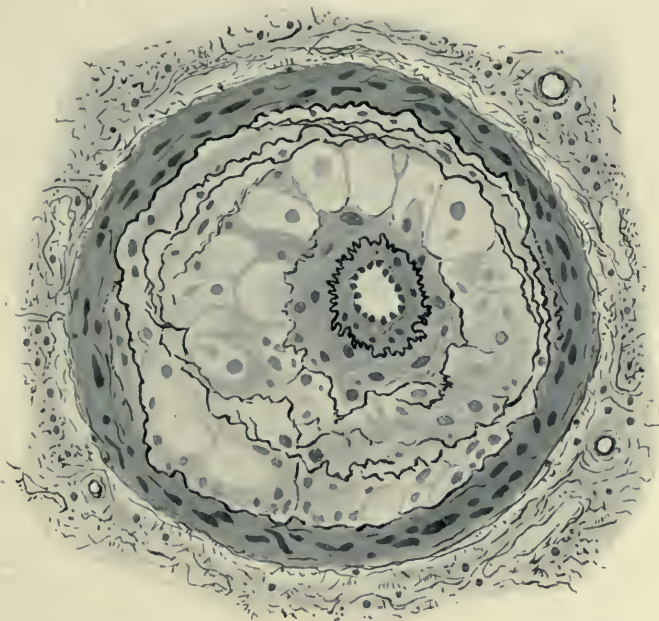


Fig. 1.

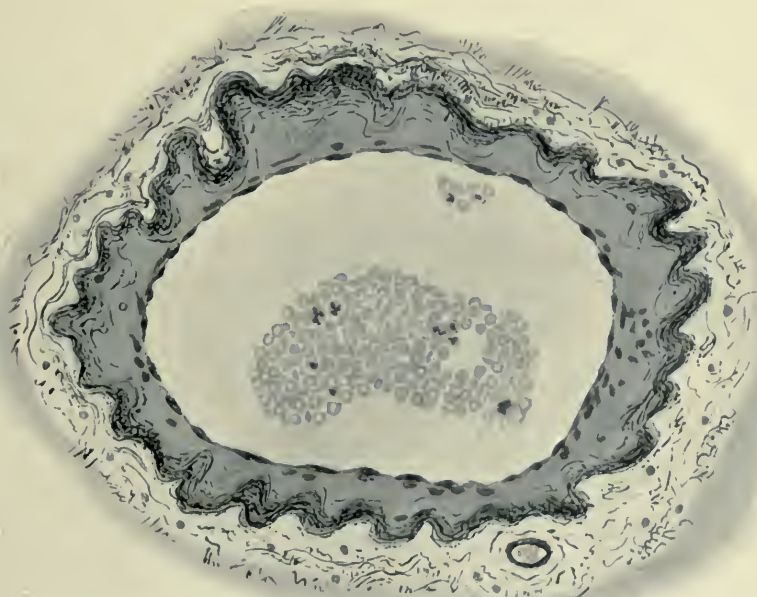


Fig. 2.











ILLUSTRATING DR. VERHOEFF'S ARTICLE ON "PARINAUD'S CONJUNCTIVITIS; A MYCOTIC DISEASE DUE TO A HITHERTO UNDESCRIBED FILAMENTOUS ORGANISM."



FIG 1. Showing masses of the microorganisms in the superficial lymph spaces of the conjunctiva. They are being invaded by endothelial phagocytes and represent early stages in the formation of areas of cell necrosis. Formalin fixation. Carbol-thionin stain. Photo x 210.

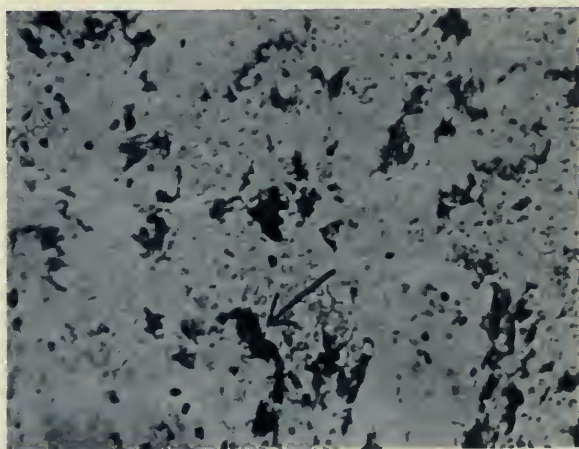


FIG. 2. Showing masses of the microorganisms in a large area of cell necrosis. Zenker's fixation. Modified Gram stain. Photo x 300.



ILLUSTRATING DR. VERHOEFF'S ARTICLE ON "PARINAUD'S CONJUNCTIVITIS; A MYCOTIC DISEASE DUE TO A HITHERTO UNDESCRIBED FILAMENTOUS ORGANISM."

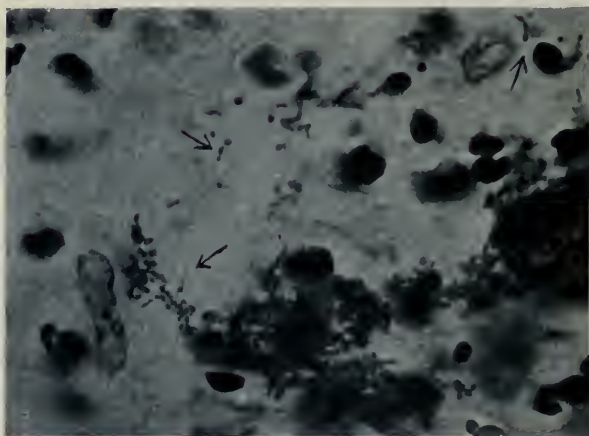


FIG. 3. Showing filamentous structure of masses, and individual filaments. Modified Gram stain. Photo x 1500.



FIG. 4. Individual filaments seen in sections. Zeiss immersion, obj.  $\frac{1}{2}$  oc. 4.



## ARCHIVES OF OPHTHALMOLOGY.

PARINAUD'S CONJUNCTIVITIS; A MYCOTIC DISEASE DUE TO A HITHERTO UNDESCRIBED FILAMENTOUS ORGANISM.<sup>1</sup>

BY F. H. VERHOEFF, A.M., M.D.,

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*(With four illustrations on Text-Plates VI. and VII.)*

IN 1889 Parinaud described a rare conjunctival disease characterized by the occurrence of peculiar granulations, springing usually from one of the retrotarsal folds, and associated with inflammatory enlargement of the preauricular gland or other regional lymphatic glands. In some cases there is moderate constitutional reaction evidenced by chills and fever. The affection is almost invariably confined to one eye, the cornea is never attacked by the process, and recovery takes place within a few weeks to six months. The affected glands occasionally break down. Within recent years numerous cases of the disease have been reported, and although it is thought to be infectious in origin the specific microorganism has hitherto escaped detection. Animal inoculations have given uniformly negative results. Parinaud believed that the disease was transferred from animals to man, but his evidence for this view was insufficient and subsequent observers have failed to confirm it.

In 1904 G. S. Derby and I reported a case of the disease in which I had made out certain histological features not previously recognized that we believed differed from those of any

<sup>1</sup> Read before the New England Ophthalmological Society, April 8, 1913.

other ocular disease.<sup>1</sup> We therefore felt justified in concluding that the histological character of the lesions in Parinaud's conjunctivitis was distinctive of this disease alone. In the following year we reported a second case<sup>2</sup> in which I had found the histological lesions essentially identical with those of the previous case. Since then, although numerous cases of Parinaud's conjunctivitis have been examined, so far as I know only one observer, namely Bernheimer,<sup>3</sup> has fully confirmed my findings. Simultaneously with Bernheimer, Hoor<sup>4</sup> published an elaborate communication on Parinaud's conjunctivitis and reported a case of his own in which the lesions differed histologically from those described by me. Judging by the illustrations of the lesions, I am certain that this case was not one of Parinaud's conjunctivitis. Nevertheless, this paper has attracted wide attention and no doubt has been in large part responsible for the opinion that now seems to prevail that there is nothing characteristic in the histology of Parinaud's conjunctivitis.

More recently a number of observers have reported cases of conjunctival tuberculosis which they believed proved that Parinaud's conjunctivitis was in reality due to tuberculosis. If these observers had shown that their cases possessed the characteristic histological features of Parinaud's conjunctivitis, their contention would merit consideration. But since they did not show this, their cases simply serve to illustrate the fact that certain types of conjunctival tuberculosis may readily be mistaken for Parinaud's conjunctivitis, a fact pointed out by Parinaud and emphasized by Derby and myself in our first paper on the subject.

Including the two cases previously reported with Dr. Derby, I have now examined histologically twelve cases of Parinaud's

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<sup>1</sup> VERHOEFF and DERBY. "Parinaud's Conjunctivitis." ARCHIVES OF OPHTHALMOLOGY, 1904, vol. xxxiii., p. 389.

<sup>2</sup> VERHOEFF and DERBY. "Die pathologische Histologie der Parinaud-schen Conjunctivitis." *Klinische Monatsblätter für Augenheilkunde*, 1905, vol. xlii.

<sup>3</sup> ST. BERNHEIMER. "Ein Beitrag zu Parinaud's Konjunktivitis." *Klinische Monatsblätter für Augenheilkunde*, 1906, vol. xlv., p. 323.

<sup>4</sup> HOOR. "Die Parinaudsche Konjunktivitis." *Klinische Monatsblätter für Augenheilkunde*, 1906, vol. xlv., p. 289.

conjunctivitis.<sup>1</sup> Two of these were cases of Dr. P. S. Smyth, to whom I here desire to express my obligation. The remaining cases were all seen by me personally at the Massachusetts Charitable Eye and Ear Infirmary. Clinically these cases presented no exceptional features. Each was monocular and showed conjunctival granulations with smaller or larger white areas on their surfaces (areas of cell necrosis) and enlargement of the preauricular lymphatic gland. Marked improvement followed excision of the granulations in all cases, showing that this is the most efficient treatment. In no case seen by me did the gland actually break down so that I could examine its contents. No history strongly suggestive of an animal origin for the disease could be obtained. In one case the patient stated that he had been struck in the affected eye by a grapevine three days before the first ocular symptoms and four days before the enlargement of the preauricular gland. This suggests the possibility of plants as sources for the infection, but the time elapsing after the injury was so short that the latter may have been only a coincidence.

Histologically all of these cases are so similar to each other and to the two cases previously reported that a detailed description for each is unnecessary. The characteristic feature is the occurrence of focal areas, varying in size and shape, infiltrated with endothelial phagocytes in various stages of necrosis. These endothelial cells are not packed close together and united with each other as in tuberculosis, but are discrete. The necrosis bears no resemblance to the caseation of tuberculosis, involving the cells alone. There is a relatively small proportion of lymphoid and plasma cells in the areas, but almost no pus cells. Owing to the fragmentation of the nuclei many of the cells at first glance might be mistaken for pus cells. Special staining usually shows a small amount of fibrin in the areas. Usually the areas are situated just beneath the epithelium, but they also occur deeper down. Generally they are about .3mm to .5mm in diameter, but

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<sup>1</sup> It may be of interest to note that during the same period of time I examined three cases of conjunctival tuberculosis. One of these was histologically atypical but did not resemble Parinaud's conjunctivitis. The diagnosis was confirmed by finding tubercle bacilli in sections, and also by animal inoculation.

occasionally are very much larger than this. In some cases many sections must be examined before they are found. The neighboring lymph spaces are distended with cells and often contain numerous endothelial phagocytes filled with cell debris. Surrounding the areas of cell necrosis the tissue is densely infiltrated with plasma cells; lymphocytes, eosinophiles, and mast cells occurring only in small numbers. There is also formation of ordinary granulation tissue, which involves especially the areas of cell necrosis, the amount depending evidently on the duration of the process.

In two of the cases there was some hyperplasia of lymph follicles in the vicinity of the lesions. The germinal centers of these follicles should not be mistaken for areas of cell necrosis.

Thus each of these twelve cases presented not only the clinical features of Parinaud's conjunctivitis but also the characteristic histological lesions previously described by me. This evidence is sufficient to prove that Parinaud's conjunctivitis is a distinct entity. Recently, however, I have demonstrated in the areas of cell necrosis the microorganisms described below and hence placed the significance of these areas beyond any doubt.

#### THE SPECIFIC MICROÖRGANISM.

The tissue from the most recent case examined by me (a case of Dr. P. S. Smyth) had been fixed in 10% formalin. Sections of it stained in hematoxylin and eosin showed the typical picture of Parinaud's conjunctivitis just described. Sections stained in carbol-thionin showed numerous bluish masses in the tissue that could readily be seen with a low magnification. With an oil immersion lens and strong daylight illumination the masses could with difficulty be resolved into conglomerations of filaments with dots. Having convinced myself that I was dealing with a microorganism, I investigated the material from my previous cases and found the same microorganism in all but one of them. In ten cases it was found in sections. The best specimens were obtained by restaining sections that had originally been stained in hematoxylin and eosin and mounted in balsam. It was in



this way possible to select sections that contained well-marked areas of cell necrosis. In one case in which the microorganism was not found in sections, it was demonstrated in tissue scrapings. In the one case in which it was not demonstrated, the material was insufficient for the purpose.

#### TECHNIQUE.

*Fixation:* The best results are obtained after fixation in Zenker's fluid. Formalin fixation gives inconstant results.

*Examination of tissue scrapings:* The microorganism may be demonstrated satisfactorily by this method. The hardened tissue is placed in absolute alcohol overnight. It is then placed on a cover slip kept moistened with absolute alcohol and its cut surface scraped with a knife. The scrapings are allowed to dry on the cover slip to which all but the largest particles will adhere during the subsequent staining. (Scrapings dried down from water will not thus adhere.) The staining is the same as for sections.

*Staining:* In sections stained in hematoxylin and eosin, by the ordinary Gram stain, or by the tubercle bacillus method, the microorganism is invisible.

*Carbol-thionin:* This is fairly satisfactory after formalin fixation, but the results are far inferior to those obtained with the modified Gram method given below. Sections are first stained in eosin and then in a freshly mixed carbol-thionin solution<sup>1</sup> for thirty minutes. Differentiation in 95% alcohol. Oil of origanum. Xylol. Xylol-balsam.

*Wright's modification of Leishman's stain.* This stains the microorganism so that it can be recognized.

*Modified Gram stain:* The results obtained by this method leave little to be desired. The essential difference between it and the ordinary Gram stain lies in the preliminary treatment of the sections with xylol-balsam. The use of chloroform for differentiation, which was suggested to me by Dr. William H. Smith, is important for bringing out the granules in the microorganism. Paraffine sections are preferable, but I have obtained satisfactory results also with celloidin sections. The sections are first brought into xylol-balsam in the usual way, where they remain for five minutes or longer. If the sections are already mounted in balsam it is simply necessary to remove the cover slips by the aid of heat. They are then treated rapidly with successive applications of xylol, chloroform, 95% alcohol,

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<sup>1</sup> This is prepared in the same proportions as my carbol-fuchsin solution. ("An Improved Carbol-Fuchsin Solution," *Journal A. M. A.*, May 4, 1912, p. 1355.)

and water. In this way the balsam is incompletely removed. They are then stained as follows.

Aniline gentian violet, 5 minutes. Water.

Lugol's solution (1:2:100), 30 seconds. Water.

95% alcohol until excess of color is removed, about one minute.

Chloroform to differentiate and dehydrate, about 10 seconds.

Wash thoroughly in xylol. Xylol-balsam.

Remove balsam as before and repeat staining process.

This method sometimes stains fibrin, but after the characteristic appearance of the microorganism is once seen there is no danger of confusing it with fibrin.

In all cases the microorganisms occur in irregular masses measuring from 10 to 60 micra in diameters (Fig. 2), but isolated individuals are also seen. At first glance the masses may appear to consist of minute dots, but careful examination with an oil immersion lens shows that they are composed of filaments. The latter seem to have no definite arrangement but are simply intertwined about each other. The individual filament is extremely delicate, stains faintly, and has single contours. It may be apparently straight or more often irregularly curved. Sometimes it is more than once sharply bent almost at right angles. At almost regular intervals along the filament round dots occur which stain intensely by the modified Gram method (Figs. 3 and 4). These are never exactly centered in the axis of the filament but project noticeably above its surface. The dots are seldom all of the same size on one filament, the largest having a diameter a little greater than that of the filament itself. Usually they are close together, at intervals of about three or four of their diameters, but occasionally they are far apart. In thickness the filaments are usually about  $.33\mu$ , that is, about the thickness of the influenza bacillus, but individuals half this size are occasionally seen, especially in tissue scrapings. In sections the filaments seldom appear very long, usually 3 to 10 micra, due no doubt to their quickly passing out of the plane of the section. In the tissue scrapings, however, filaments 30 micra in length may be seen. Some of the long filaments appear either to become thinner or to stain less intensely towards their ends.

Except in one case the microorganisms are found only in or within the close vicinity of well-marked areas of cell necrosis. In this case, which was evidently an early one, numerous masses can in addition be seen in the superficial lymph spaces, and are especially prominent just beneath the epithelium (Fig. 1), where, as I have pointed out, the areas of cell necrosis usually occur. Such masses are undoubtedly the starting-points for these areas, for all the stages in the formation of the latter can be made out, beginning with the invasion of a mass of microorganisms by a few endothelial cells. Thus this case is alone sufficient to exclude the possibility of the microorganisms being secondary invaders. The predilection of the microorganisms for lymph spaces explains the early involvement of the regional lymph glands in this disease.

#### CONCLUSIONS.

In eleven out of twelve consecutive cases, each having the clinical features described by Parinaud, and each presenting essentially the same characteristic histological picture, a minute filamentous microorganism was found. The absence of any other demonstrable microorganisms in the lesions, the unusual character of the microorganisms found, their great abundance, and the fact that they were so situated as to explain the lesions, leave no reasonable doubt that they were the cause of the disease. Their occurrence in the areas of cell necrosis previously pointed out by me confirms the diagnostic importance of these areas.

Since no branching of the filaments could be made out, the microorganism may for the present be classed as a leptothrix. So far as I can ascertain, no similar microorganism pathogenic for man has previously been described. Now that its morphology in the tissues and suitable methods for staining it are known, its cultivation on artificial media should soon be accomplished. The experimental production of the disease should also again be attempted, monkeys preferably being selected for the purpose.

# HYPOPHYSIS DISEASE (FROM THE OPHTHALMOLOGICAL STANDPOINT), WITH A REPORT OF TWO CASES.

By EMORY HILL, M.D., CHICAGO.

(With four line cuts in the text.)

I. ANATOMY AND PHYSIOLOGY OF HYPOPHYSIS. CLASSIFICATION OF SECRETORY DISORDERS. II. CASE REPORTS AND INTERPRETATIONS. III. REVIEW OF LITERATURE OF EYE SYMPTOMS OF HYPOPHYSIS DISEASE.

## I. *Anatomy and Physiology of Hypophysis. Classification of Secretory Disorders.*

UTHOFF<sup>1</sup> has well said that temporal hemianopsia and amaurosis were the striking symptoms on which the diagnosis of pituitary tumors depended in the preophthalmoscopic days, and the recognition of a more extended symptomatology necessarily awaited the era of more exact diagnostic methods. In recent years we have come to regard hypophysis disease as not infrequent, and to bear in mind the possibility of such disease when confronted by obscure cases of exophthalmos, ocular-muscle palsies, optic-nerve disease, various visual-field limitations, and evidence of general intracranial pressure.

The volume of experimental work on the hypophysis done in the past decade has increased our knowledge of this obscure organ as one of the series of ductless glands concerned in the elaboration of internal secretions, and some fairly definite

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<sup>1</sup> "Augensymptome bei den Hypophysis-Affektionen und der Akromegalie," *Transactions 16th Int. Med. Congress*, Budapest, 1910.



conclusions have been established, although many of the questions raised in the course of such experimentation are still in dispute. The recent work of Cushing<sup>1</sup> presents, with dramatic interest, the studies of the Johns Hopkins laboratories and of other researches, bringing up to date the status of this line of investigation, and shows abundant reason for the hope that we shall eventually possess information of very practical sort on which to base an early recognition of perversions of hypophysis secretion and effectual treatment therefor.

At the risk of being somewhat dogmatic for the sake of conciseness, one may venture the following résumé<sup>2</sup>: The hypophysial vesicle is formed by an evagination of the mucous membrane of the buccal cavity (ectoderm) which joins with a projection from the floor of the third ventricle. The former becomes the pars anterior, the latter the pars posterior (nervosa). The epithelium of this projection is differentiated from the anterior epithelium to form the pars intermedia, the cavity of the original vesicle remaining as a cleft separating the pars anterior from the pars intermedia.

The anterior lobè is characterized by two kinds of cell, the chromophiles (eosinophiles) which predominate when the gland is hyperfunctioning, and the chromophobes which predominate when the gland is hypofunctioning. It is probable that the secretion of the anterior lobe is discharged into the neighboring thin-walled venous sinuses.

The pars intermedia constitutes an epithelial investment for the pars posterior, having a tubular arrangement of cells which invade the nervous tissue extending nearly to the infundibular canal in man. These cells secrete a colloid substance comparable to that found in the thyroid gland.

The pars nervosa has no true nerve cells but ependymal and neuroglial tissue loosely interlaced. Islands of undifferentiated mouth epithelium (inclusions) are found upon the surface of the posterior lobe. This lobe discharges its secretion into the cerebro-spinal fluid.

The anterior lobe is essential to life, its removal resulting

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<sup>1</sup> *The Pituitary Body and its Disorders*, 1912

<sup>2</sup> Taken from Cushing's and Dean Lewis's writings (*Transactions American Academy of Ophthalmology and Oto-Laryngology*, 1911).

in death from cachexia. Injection of anterior lobe extract causes some pressor effect on the circulation (perhaps due to traces of the pars intermedia which possesses definite pressor qualities). Undersecretion results in a lowering of the body temperature.

Acute overactivity of the posterior lobe results in a rise of blood pressure with slowing and strengthening of the heart beat, diuresis (due to stimulation of the renal epithelium), uterine contraction, dilatation of the pupils, increased carbohydrate assimilation (lowered tolerance), and a galactagogue action. Chronic oversecretion produces emaciation. Undersecretion causes an increased carbohydrate tolerance. Cushing<sup>1</sup> believes that "normal posterior lobe activity is essential to effective carbohydrate metabolism." While the posterior lobe is concerned especially with processes of metabolism, the anterior lobe is concerned with skeletal growth.

It has not yet been possible to reproduce the symptoms of pituitary glandular hypertrophy by feeding with gland extracts. The effects of undersecretion of the whole gland, however, have been observed after partial hypophysectomy. They embrace adiposity; nutritional changes in the skin and its appendages; disturbance of carbohydrate metabolism, body temperature, growth, and renal secretion, with sexual inactivity or atrophy; and modifications in most of the other ductless glands. The adiposity is generalized; the skin becomes dense, dry, and less movable; the hair becomes bristly and falls out; the temperature is subnormal; mental dulness arises, with irritability; and there is diminished sensibility to pain.

Considering the numerous alterations possible as a result of hyper- and hypo-secretion of each of the lobes, and the coincidence of overgrowth and overfunction of one lobe with pressure atrophy of the other, we readily see that the symptom-complex in a given case may be exceedingly involved and difficult to explain by reference to the inexact experimental conclusions at present arrived at. The entire question of the relative activities of the various members of the ductless gland series; "the pluri-glandular syndrome," so-called; the normal hypertrophy of the hypophysis at puberty and during

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<sup>1</sup> *The Pituitary Body and its Disorders*, 1912.

pregnancy; the therapeutic value of pituitary extract in menstrual disorders and in labor; these and many other questions are of great interest, but scarcely germane to the present discussion. The likelihood of pressure effects upon the hypophysis from brain lesions elsewhere, either impairing hypophysial function or preventing the escape of normally elaborated hypophysial secretion, still further complicates the interpretation of symptoms.

The general term "dyspituitarism" covers a large group of cases in which neither hypersecretion nor hyposecretion alone serves to explain the phenomena present. However, two large groups may be identified in which the predominating factors are hyperpituitarism and hypopituitarism. To the former belong the cases of gigantism and acromegaly, general overgrowth of bony framework occurring when the glandular overactivity begins in childhood; overgrowth of the acral parts characteristic of acromegaly when oversecretion is delayed until epiphyseal union has occurred (after puberty). Excessive multiplication of the eosinophile cells of the pars anterior is characteristic of this group. Hypopituitarism is best illustrated in the Fröhlich syndrome, or "dystrophia adiposo-genitalis" of Bartels, a condition of generalized adiposity with delayed development of the genital organs, scant pubic and axillary hair, dry skin, and polyuria; the so-called secondary sexual characteristics failing to develop. When the disease begins in adult life there are retrogressive changes (amenorrhœa, testicular atrophy, loss of sexual power and desire), and a loss of the secondary sexual characteristics, with the assumption of the feminine contour of body by males. A chromophobe struma is the characteristic lesion in this group representing the hypofunctioning gland.

## *II. Case Reports and Interpretations.*

CASE I.—Cyst of the hypophysis causing the clinical symptoms of hypopituitarism, with primary optic atrophy and atypical visual field distortion. Operation, followed by marked improvement, and no recurrence in two years.

I am indebted to Dr. Cassius D. Wescott for the privilege of studying this case during the past two years and of reporting it now.



S. W., American, male, was seen first, at the age of 15 years, on October 8, 1908, complaining of dimness of vision. He was an undersized, anemic-looking boy, the son of healthy parents who have one other child, a boy two years older than the patient. The mother has had no miscarriages. There is no family history of importance. He had measles, chicken-pox, and pertussis in early childhood, and typhoid fever at the age of 9 years. Since the typhoid infection he has never been robust. His play has been hampered by shortness of breath. Enuresis was present until the sixteenth year. Between the ages of 8 and 12 he was under the care of a physician on account of polyuria. No definite lesion was discovered. The normal changes of puberty did not occur, the voice remaining of the feminine type, erections and sexual desire being entirely absent. Headaches, with nausea and vomiting, occurred at frequent intervals so that he was often compelled to be absent from school for one or two days each week. The pain was frontal and temporal, radiating to the occiput. Photophobia and poor vision were helped in 1904 by securing glasses which he wore for 9 months.

At the time of examination (October, 1908) he stated that his vision had become dim in the right eye six days previously, and after two days had suddenly failed entirely. R. V. = hand movements; L. V. =  $\frac{6}{12}$ . The right pupil exhibited no direct light reflex. The maculae were both very granular, and the retinae of the "shot-silk" type. No lesion was found to account for the poor vision which was regarded as an hysterical manifestation. This opinion was strengthened by the improvement in the right vision to  $\frac{6}{15}$  in twelve days, and to  $\frac{6}{9+}$  in one week more, with practically no treatment except strong suggestion of recovery. Refraction under atropine cycloplegia on October 28th revealed the following.

$$\text{R. E.} + 1.75 \text{ sph. } \bigcirc + 0.25 \text{ cyl. ax. } 75^\circ = \frac{6}{9+2}$$

$$\text{L. E.} + 1.50 \text{ sph. } \bigcirc + 0.50 \text{ cyl. ax. } 80^\circ = \frac{6}{9-2}$$

He was given this correction less + 0.50 sph.

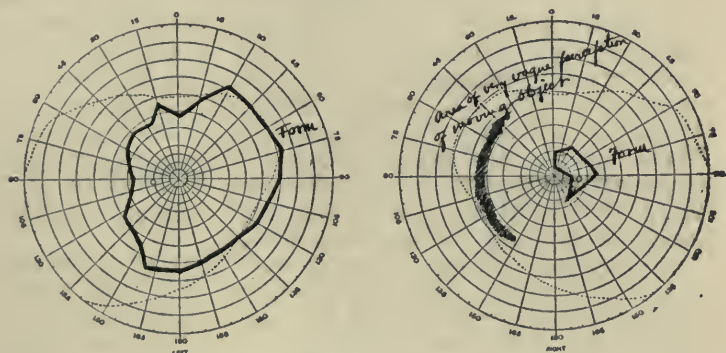
Nothing further was heard from the boy until February 3, 1911, when he reported with the complaint of severe sick headache which he attributed to a fall four weeks previously. He had slipped on an icy pavement and struck the back of his head. He was stunned but did not lose consciousness, and succeeded in walking to his home, a distance of several city blocks, without help. He was very positive that some steady failure of vision had been going on for a time previous to the accident, but the failure proceeded more rapidly thereafter until one week before report-



ing, when a sudden decrease in vision occurred, more manifest in the right eye which began to turn outwards.

Upon examination, we found the left eye to fix while the right diverged moderately. Ocular movements were full in all directions, though, with both eyes open, attempted convergence was practically nil with the right eye. The conjunctivæ were unduly pale, the corneæ clear, the pupils 3.5mm and round (the right possibly very slightly larger than the left). There was very pronounced hippus, especially on the right; and occasionally, when bright light

FIG. 1.



CASE I—Eighteen days before operation.

was thrown into the right eye, the pupil would first dilate widely and then exhibit hippus. Both pupils reacted promptly to bright light and to convergence; moderate light caused no contraction of either pupil if the other was shaded, but caused contraction of both pupils when both were simultaneously illuminated.

Intraocular examination showed the media to be clear, both nerve heads gray, the right being decidedly more atrophic than the left, with a small pigment heap at the upper temporal border. The disk edges were well defined and there was no evidence of previous neuritis. The arteries were slightly contracted and tortuous, but the vessels and the central area of the retina appeared more nearly normal than one would suppose with such atrophic disks. The peripheral parts of both retinæ were thinned, the chorioidal circulation showing very plainly. R. V.  $\frac{6}{45}$ ; L. V.  $\frac{6}{15}$ ; not improved by correction. The fields of vision, as seen in Fig. 1, show, in the left eye, a marked contraction in the temporal half, and, in the right, only a small paracentral area (temporal) preserved, with a crescent-shaped area of very vague perception of the moving object in the nasal field.

The patient was referred for neurological study to Dr. Hugh T. Patrick who made a diagnosis of pituitary neoplasm, and finally to Dr. Allen B. Kanavel for operation. The notes kindly furnished me by Drs. Patrick and Kanavel complete the case history: the patient, though 18 years of age, has the physical development of a boy of 12, with marked pallor. He is somewhat listless and indifferent to his surroundings. His height is 4 feet 9 inches (the same 1 year before). Generalized adiposity is of the feminine distribution, though not excessive; nor are the breasts over-developed. Axillary and pubic hairs are practically absent, there being only a fine down which is not visible to ordinary inspection. Ears, nose, and teeth are normal. (The patient is quite positive that five or six teeth of the second dentition were lost at the age of 12 and a third set developed.) The right half of the mouth is not quite so wide as the left half. Thyroid and thymus are not palpable. There are no glandular enlargements. Lungs, heart, and abdomen are negative, with the possible exception of a slight accentuation of the second heart sounds. Neither superficial nor deep reflexes are impaired.

On February 20, 1911, the boy was admitted to Wesley Hospital. At this time his condition was distressing. Severe headache and almost constant vomiting were uncontrollable. He was exhausted from lack of sleep. The vision could not be tested accurately, but he was practically blind. Polyuria was marked and glycosuria had developed.

The X-ray picture shows a much enlarged sella with a defective shadow below, which probably indicates an erosion of its floor. The picture does not give any accurate idea about the sphenoidal cells.

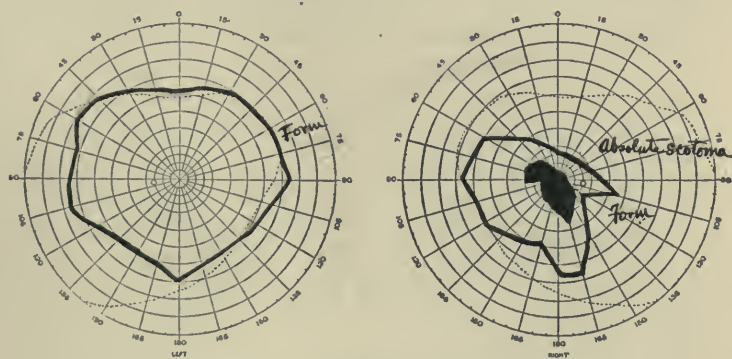
Dr. Kanavel operated,<sup>1</sup> on February 22d, by his method of infranasal approach through the sphenoid. Urotropin was administered before admission and continued throughout the patient's stay in the hospital. Local anesthesia (cocaine and adrenalin), with gas and ether by mouth, was followed by rectal anesthesia (ether) during the operation. No sphenoidal cells were found and the bone was chiseled through, exposing a pearly white mass about  $\frac{3}{4}$  inch in diameter. Attempt to aspirate the tumor, which was believed to be a cyst, failed. Incision through the dura released fluid, and there was marked pulsation of the mass

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<sup>1</sup>This description is taken from the hospital records of Dr. Kanavel, who has reported the case more fully from the surgical standpoint. (Western Surgical Assoc., Cincinnati, Dec. 20, 21, 1912.)

after partial evacuation. Fully one ounce of chocolate-colored fluid escaped. The cyst<sup>1</sup> was curetted, the substance proving to be granular detritus. Efforts to remove the cyst walls were unavailing. The cavity and the nose were packed with iodoform gauze. The nose was sutured into place and the septum held in the median line by the packing. This was removed in three stages at intervals of 36, 48, and 56 hours. Headache and vomiting were almost continuous for 48 hours, when they ceased upon the removal of the gauze, which was followed by a gush of at least  $\frac{1}{2}$  ounce of fluid. Glycosuria ceased immediately

FIG. 2.



CASE I—Five weeks after operation.

after the operation; after ten days polyuria returned (6400 cc); acetonuria was discovered and treated successfully by levulose medication, while the polyuria rapidly subsided. An infection of the face developed, suggestive of erysipelas, which was gone in one week's time. There was immediate improvement in vision and the headache ceased after three days, and has not returned. The patient was able to leave the hospital on March 17, 1911, and was exhibited before the Chicago Neurological Society. His vision was R., hand movements; L.,  $\frac{6}{15+1}$ . No change was observed in the eye grounds.

On March 30th, we noted: R. V. with correction,  $\frac{1}{45}$ ; L. V. with correction,  $\frac{6}{9}$ . The fields of vision show distinct improvement (Fig. 2). In the left, the temporal

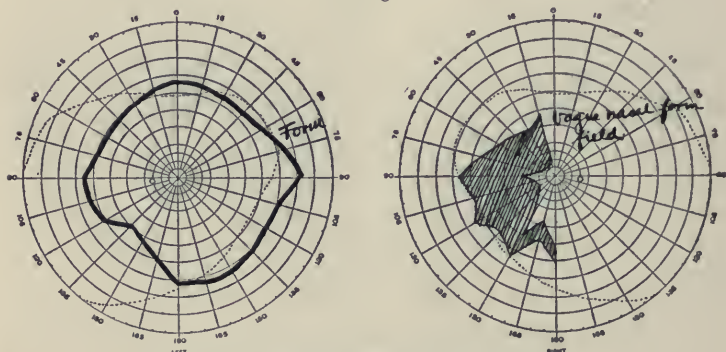
<sup>1</sup> Dr. S. A. Matthews of the University of Chicago, in a personal communication, tells me that he found the cyst contents to contain a pressor substance. He injected it into a dog weighing 3kg and obtained an increase of 20mm of mercury which persisted for more than one half hour. Dr. Matthews calls attention to the fact that cystic fluids generally cause a fall in blood pressure.



field has widened approximately from  $30^{\circ}$  to  $60^{\circ}$ . In the right, the boundaries include most of the space between the two small areas preserved on February 3d, being roughly  $30^{\circ}$  both up and temporally, and  $50^{\circ}$  both down and nasally. There is a large central scotoma.

On February 10, 1912, he was comfortable and the left vision still  $\frac{6}{9}$ . On March 7th, he complained of blurring in the left nasal field. The left disk was found to be very pale, almost the color of the right disk. Rhinoscopic examination revealed no mass projecting from the sphenoid, only an exuberant mucous membrane, and Dr. Kanavel could find no evidence of a refilling of the cyst. The field of vision of the left eye showed some temporal contraction as compared with the fields taken on March 30, 1911, but a

FIG. 3.



CASE I—Twenty months after operation.

wider field than that of February 3, 1911 (before operation). He was given strychnia gr.  $\frac{1}{40}$  t. i. d. On April 2, 1912, L. V.,  $\frac{6}{9+2}$ . Strychnia was increased to gr.  $\frac{1}{30}$  t. i. d.

On October 15, 1912, the patient called at our request. The left vision is  $\frac{6}{9+2}$ . He is feeling well and working with comfort. The fields (Fig. 3) show, in the left, a widening on the temporal side exceeding the field taken in March, 1912, and almost equal to the field of March, 1911 (which is the best recorded); in the right eye there is a decided failure since March, 1911, the form field being only vague and limited to the nasal side, not reaching fixation and being wanting in part of the upper and lower nasal quadrants. The right vision is fingers at 8 inches instead of  $\frac{1}{45}$  as noted in March, 1911.

Under Dr. Kanavel's direction, the patient received from 9 to 12 grains daily of anterior lobe extract for the period of six months following the operation. No growth was observed during this time, but possibly some develop-



ment of hairs on the arms. For the next two months he received from 9 to 12 grains daily of extract of the whole gland. Following this his sugar tolerance was tested. While taking 24 grains of whole gland extract he was given 150 grams of glucose without the production of glycosuria. The patient refused to remain in the hospital longer than five days for these tests. Since that time (14 months) he has received 24 grains of whole gland extract daily with no change in measurements.

*Interpretation:* This case is a fairly typical example of the Fröhlich syndrome which Bartels called "dystrophia adiposogenitalis": an underdeveloped, overfat boy with infantile sexual organs, entire absence of secondary sexual characteristics, and a history of polyuria, with eye symptoms suggestive of chiasmal disease (primary optic atrophy and visual field contraction chiefly on the temporal side). The early transient failure of sight is consistent with the cystic character of the growth found at operation. The trauma followed by rapid decrease in vision, severe headache, nausea and vomiting, polyuria, and glycosuria just before operation, are indicative of intracranial growth. The mass evacuated gave proof of a degenerative change in the hypophysis, including the pars anterior, and the pars intermedia (detritus; blood pressure rise on injecting the fluid into a dog). Polyuria, so frequent in cases of hypopituitarism, is difficult to explain in the light of experimental knowledge. Mechanical stimulation of the posterior lobe by the growth in front would account for stimulation of the renal epithelium; but the adiposity is believed to be the result of insufficient posterior lobe secretion. The glycosuria developing just before operation (when the patient was taking no food) was a transient phenomenon and cannot be explained as an evidence of posterior lobe stimulation, but as the result of the tremendous intracranial pressure, as is found in many cases of brain tumor. The widening of the visual field after operation was mainly observed in the temporal half, being a reversal of the original process of narrowing characteristic of these cases.

In view of the general condition, since associated with deficient hypophysial function, which this patient exhibited in boyhood we must believe that his visual disturbance in 1908 was of pituitary origin and not hysterical. Trauma was

in all probability a factor in the rapid increase of symptoms in 1911. Cushing<sup>1</sup> found a history of injury in six of his cases, all being of the class of hypopituitarism. He states that 15 per cent. of a series of 300 cases of brain tumor gave a history of trauma. Postoperative polyuria was extreme, a condition often observed as a transient phenomenon. Whether the trauma of the surgical manipulations caused it is an interesting question. In connection with the post-operative improvement in the vision of the left eye, Cushing's<sup>1</sup> observation is of interest: "Amblyopia associated with primary atrophy more often represents a physiological block to light impulse than an actual destruction of the nerves."

CASE II. Dyspituitarism (Cushing); a case presenting evidence of former hyperfunctioning of the hypophysis, succeeded by a state of glandular insufficiency, probably due to pressure from a neighboring growth. Abducens paresis (right); primary optic atrophy, both eyes, with blindness (right) and temporal hemianopsia (left).

B. T., male, aged 16 years, of Norwegian birth and parentage, was seen first on October 17, 1912, through the courtesy of Dr. E. V. L. Brown. His complaint was blindness in one eye and headache.

The family history reveals nothing of importance. The father died at the age of 43 from heart disease. The mother is 44 years old and healthy. One brother died from injury at the age of 17 years. Several children were born dead (premature?).

The patient is the second child; birth was normal; he had measles and scarlet fever in childhood. At the age of two years he fell down two flights of steps and struck on the right side of the forehead, making a scar which is still visible. Since earliest school days he has suffered from severe headaches which finally necessitated his giving up his schooling. Five years ago, after coming to America, he consulted an optician on account of headache, and was told that his right eye was almost blind and his left below normal in vision. The headaches were severe enough to incapacitate him for a day or more. No nausea or visual disturbance accompanied them. Glasses benefited him in respect to headache but did not improve vision. Several changes of lenses were made in the next two years. Two years ago he observed a dimness in the left visual field, and a decrease of vision in each eye, the right becoming

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<sup>1</sup> *The Pituitary Body and its Disorders*, 1912.

practically blind. He worked as a grocery clerk for eighteen months, but had to abandon this some four months ago. The headaches, which were formerly frontal, assumed a bitemporal character, and the pain would be increased by tipping the head to either side.

In November, 1911, while visiting in Christiania, he consulted Prof. Schiötz, who told him that the visual disturbance was due to brain pressure, and gave him medicine. On August 31, 1912, he saw Dr. E. V. L. Brown, who noted L. V.,  $\frac{5}{10+3}$ , and again on September 20th, L. V.,  $\frac{5}{10-2}$ . Refraction: L.  $\pm 0.75$  sph. + 1.00 cyl. ax.  $180^\circ = \frac{5}{10-2}$  Prof. Schiötz writes as follows in reply to Dr. Brown's request for information as to the findings in 1911: "Dec. 9, 1911. The sella turcica seems to be dilated and the dorsum thinned and deviated backwards. When he consulted me his right eye was completely blind; on the left S =  $\frac{6}{10}$ . Loss of entire temporal field. I did not advise operation, only remarked that if sight continually decreased, operation perhaps ought to be tried (trepanation)." On September 25th, Dr. Brown noted L. V.,  $\frac{6}{10+2}$  (after three minutes' effort); with correction, the same.

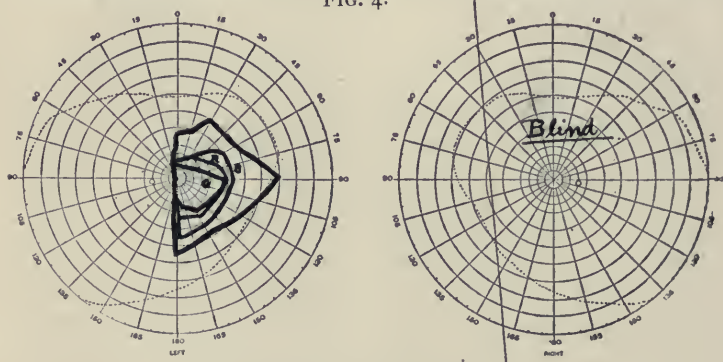
My examination on October 7th duplicated Dr. Brown's findings of the previous month. There was no exophthalmos. The right eye was convergent  $10^\circ$  and tilted up a trifle, while the left fixed. Excursions were full except for failure of the right eye quite to reach the external canthus in rotation to the right. Slight nystagmoid movements developed at the extremes of all rotations, and a slow up-and-down movement of the right eye was exhibited whenever the left eye fixed intently. The lids were normal in appearance; the palpebral fissures of equal width; the palpebral conjunctivæ were very red, the bulbar conjunctivæ slightly injected. The corneæ were clear; the irides bright (hazel). The right pupil was 3.5mm, the left 3mm, both round. The right contracted very slightly when exposed to light, but promptly when light was thrown into the left eye. Prompt light reaction of the left pupil; and prompt bilateral reaction to convergence. Wernicke's hemianopic pupillary reflex was not present. Tension was normal in both eyes.

Intraocular examination revealed: Right eye, media clear. The disk pearly gray. Physiological cup; edges not sharply defined, but no exudate. Veins noticeably dilated, with wide central light streak. Pulsation of the large veins on the disk. Arteries decidedly contracted, with pronounced central light streak. Arteries slightly depress veins at crossings. Macula granular, but no lesion. No retinal or choroidal atrophy, except for one roughly quadrilateral area about  $\frac{1}{2}$  D. D. in extent, situated 2 D. D.

down and nasally from the disk. This is of a peculiar slate color, traversed by a branch of the lower temporal vein and a branch of the lower nasal artery, which cross within this dark area. Several minute vessels can be seen, all of the vessels being on a level anterior to the dark patch, which is perfectly flat. The perivascular lymph sheaths, which can be seen at various places, are especially prominent in this particular area.

Left eye: Media clear. The disk is pearly gray, especially at the temporal half, with a very deep physiological cup. The nasal portion is over-capillary. The edges are not sharply defined, but there is no swelling. The veins are larger than normal, though not so large as in the right

FIG. 4.



CASE II—October 15, 1912.

eye. The arteries are possibly a little contracted, but not so small as in the right eye. The central light streaks are fairly pronounced, and both sets of vessels are inclined to be tortuous. There is evident depression of the veins where they are crossed by the arteries. Somewhat uneven calibre of the larger venous trunks, and pulsation. There is a large cilio-retinal artery running outwards and slightly downwards from the temporal edge of the disk. The macula is granular, but shows no lesion. There is no choroidal or retinal atrophy, except in the upper nasal quadrant, where there is an irregular area reaching 2 D. D. in which there is a slight degree of the slate-colored appearance noted in the right eye. The retina is evidently thin in this locality, and the discolored area is flat, being traversed by blood-vessels which occupy an anterior position.

The visual field of the left eye (Fig. 4) shows an almost typical temporal hemianopsia, the macula and a very small portion of the temporal field above fixation being preserved.



Fields taken the following week reveal difference in respect to the outline of the form field and the interlacing of colors, which is characteristic of the changeable fields in hypophysis cases.

Dr. Ralph Hamill made a neurological study of the patient, and very kindly allows me to use his notes from which the following is partly quoted: the boy is sturdy-looking, of medium height, well developed for his age (16 years). The features are heavy, hands and feet large; skin coarse and perspires rather freely. The face is covered with acne. The nose is very broad and the right half a trifle larger than the left. Some rather coarse tremors of outstretched hands and fingers, not intentional; some tremor of lips when he shows his teeth, and of the protruded tongue. The facial, auditory, and fifth nerves are not involved. The penis and testicles are large, the pubic and axillary hairs abundant. He has had no emissions, but frequent erections and sexual desire in the past year. Height 5 feet 5 $\frac{1}{8}$  inches; feet 9 $\frac{3}{8}$  inches long; weight 144 pounds. He thinks he has fattened ten pounds and grown one or two inches and become physically stronger in the past year.

Prof. Schiötz sent a picture of the X-ray taken at his clinic in November, 1911. Dr. H. E. Potter made a second X-ray, revealing substantially the same condition. The sella is not deepened but is tilted backwards, and there seems to be an erosion of the bone just beneath the posterior clinoid process.<sup>1</sup>

The patient was admitted to the Presbyterian Hospital on Nov. 4, 1912, in the service of Dr. James B. Herrick, where further studies were made by Dr. R. T. Woodyatt to whom I am indebted for access to the hospital records. General examination revealed nothing of importance beyond the developmental peculiarities already cited. The Wassermann test was negative. The temperature record, and the carbohydrate tolerance established by feeding, are very important studies from the standpoint of hypophysis functioning. The temperature chart shows readings four times per day for eleven days. These 44

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<sup>1</sup>Cushing states that "profile radiographic measurements exceeding 15mm antero-posteriorly and 10mm in depth may be looked upon as indicating an enlargement." He quotes Arthur Keith (*Lancet*, 1911) to the effect that skeletal measurements of the sella reveal an average of 10 to 12mm antero-posteriorly, 14 to 15mm transversely, and 8mm in depth.

Otis H. Maclay of Chicago has published (*Laryngoscope*, September, 1911) careful measurements from dried skulls as follows: inter-carotid distance, 14 cases average 9.2mm; width (between carotid grooves), 20 cases average 11.4mm; depth of sella, 42 cases average 7.6mm.

records are mostly between 97° and 98° F.; only 6 times is the temperature as high as normal. For 22 days subsequently the readings were made twice a day. Of these 44 records, with the same subnormal range, the temperature reached normal only 4 times. The pulse was generally between 60 and 70, and the respirations 18 to 22 per minute.

The hospital record contains the following observations of the sugar tolerance:

1. Nov. 10, 1912.  
100gm dextrose at 7 a.m. Urine collected between 7 a.m. and 12 noon. No reducing bodies in urine.
2. Nov. 12.  
150gm dextrose (same routine as above)—No reducing bodies.
3. Nov. 13.  
200gm dextrose " " " " —No reducing bodies.
4. Nov. 17.  
300gm dextrose " " " " —No reducing bodies.
5. Nov. 20.  
50gm galactose " " " " —3.6gm in urine. (Bangs method.)
6. Nov. 23.  
20gm galactose " " " " —No reducing bodies.

Thus we observe a low temperature range and a high sugar tolerance, two conditions which Cushing has found to be such frequent accompaniments of the hypophysis disorders characterized by undersecretion, that he believes them to be of diagnostic value.

*Interpretation:* This case is not so easily classified, with reference to hypophysial functioning, as was Case I. It must be placed under the vague heading of "dyspituitarism," exhibiting a perversion of glandular secretion neither frankly overactive nor underactive. Temporal hemianopsia of the left eye points conclusively to pressure at the chiasm, and the abducens paresis and blindness of the right eye are consistent with this diagnosis. The X-ray pictures are not definite but are suggestive of pressure upon the body of the sphenoid from above. That the hypophysis has been functioning excessively is indicated by the appearance of overdevelopment for a boy of 16 years: heavy features, large extremities, coarse, perspiring skin, and somewhat precocious sexuality. The stationary vision and general comfort, aside

from headaches, for the past year point to a cessation of growth in the tumor. Low temperature and increased carbohydrate tolerance indicate that the hypersecretion of the hypophysis has now been replaced by a hyposecretion, and acromegalic changes are not to be anticipated. A tumor in the region of the hypophysis, perhaps involving the infundibulum, pressing upon the hypophysis secondarily, seems the likeliest explanation of the symptom-complex here seen. The history of injury is remote and possibly not in reality connected with the symptoms of recent years.

Operation has not been advised in this case, because the growth is believed not to be so accessible as a primary tumor of the pituitary body would be (such as in Case I) and because the symptoms are not progressing and there is no danger of acromegalic changes now that the gland is in a state of deficient secretion. The outcome with or without treatment is uncertain, and no very hopeful prognosis is justified.

### *III. Review of Literature of Eye Symptoms of Hypophysis Disease.*

As one might prophesy from the anatomic relationships of the hypophysis (chiasm above; cavernous sinus, third, fourth, ophthalmic division of the fifth, and sixth nerves, on each side of the sella turcica), a great variety of eye symptoms may be produced by enlargement of this gland. Uhthoff<sup>1</sup> mentions prominence in the region of the eyebrows; thickening and lengthening, with pendulous and edematous lids; hypertrophied lid glands and tear glands; warty growths and pigmentation of the lids; and exophthalmos. These pressure symptoms, frequently absent, suggest the question whether their absence or presence may not aid in distinguishing between the acromegalic cases and those representing a hypofunctioning gland; but the literature reveals no such differentiation. In fact, ocular muscle palsies, which might be expected as a result of bony distortion in acromegalics, are more frequent in the opposite type as Uhthoff's<sup>1</sup> statistics, recorded later, will show. Cushing<sup>2</sup> found a larger proportion of exophthalmos in the cases of hyperpituitarism, but not all of these cases were

<sup>1</sup> *Loc. cit.*

<sup>2</sup> *Loc. cit.*

frankly acromegalic, and the preponderance is not great enough to be important. Uhthoff<sup>1</sup> found exophthalmos in 8 per cent. of the acromegalic cases and suggests stasis in the cavernous sinus as the most plausible explanation, and hypertrophy of the orbital fat as an explanation of some cases. He states that the rapid growth of hypophysial tumors without acromegaly favors ocular muscle palsies as well as choked disk. Of his acromegalic cases, 10 per cent. revealed muscle palsies. The third nerve was involved 23 times, the sixth nerve 4 times, ophthalmoplegia occurred 3 times, nystagmus 12 times. In the series of tumors without acromegaly, 25 per cent. revealed muscle palsies. The third nerve was involved 26 times, the sixth nerve 7 times, ophthalmoplegia occurred 4 times; in 2 cases the nerve involved was not specified. Isolated fourth-nerve palsy is not recorded. This nerve passes through the cavernous sinus near its outer border, but is scarcely more protected than the third nerve, yet it seems to escape with the first division of the fifth. The sixth, lying against the carotid artery at the inner wall of the sinus, naturally receives pressure from even moderate enlargement of the hypophysis.

A tabulation may be made from Cushing's<sup>2</sup> series containing 36 cases with fairly complete eye examination, in which the symptoms were predominantly those of hyperpituitarism in 11, and of hypopituitarism in 25.

	Exophthalmos	Photophobia	Ptosis	Diplopia	III nerve palsy	
Hyperpituitarism	6 (0 <sup>2</sup> )	2	1	7	2 (0 <sup>2</sup> )	2 (Rt.)
Hypopituitarism	6 (0 <sup>2</sup> )	4	1	4	3	1 (L.)
	1 (Rt.)					
	1 (Left)					
	IV nerve palsy.		VI nerve palsy.		Unequal pupils	
Hyperpituitarism					4 (Rt. larger)	
Hypopituitarism	1 (Rt.)		1 (0 <sup>2</sup> )		2 (Rt. larger)	
	1 (Left)		5 (Rt.)		3 (Left larger)	
	Nystagmus	Concentric constriction of fields		Superior hemianopsia		
Hyperpituitarism	5	1		1		
Hypopituitarism	5	2				

<sup>1</sup> *Loc. cit.*<sup>2</sup> *Loc. cit.*



	Upper quadrant defect	Inferior hemianopsia	Bitemporal hemianopsia
Hyperpituitarism			1
Hypopituitarism	1 (Rt.) 1 (O <sup>2</sup> )	2 (Rt.)	7 Left 2 Right 1
	Homonymous hemianopsia	Nasal hemianopsia	Interlacing colors
Hyperpituitarism	2 (Rt.)		3
Hypopituitarism		1 (Left)	1
	Primary optic atrophy	Choked Disk Primary	Superimposed upon primary atrophy
Hyperpituitarism	3	5	1
Hypopituitarism	14 (O <sup>2</sup> ) 1 (Rt.)		8 (O <sup>2</sup> ) 1 (Rt.)
	Secondary atrophy	Primary or secondary?	
Hyperpituitarism	3		
Hypopituitarism	1		2.

Visual disturbances are indicated in the following tabulation from Uhthoff<sup>1</sup>:

207 cases with acromegaly		121 cases without acromegaly	
Amblyopia and amaurosis	15 cases	34 cases	} mostly in pre-ophthalmoscopic days.
Temporal hemianopsia	89 "	37 "	
Homonymous hemianopsia	9 "	2 "	
Choked disk	11 "	15 "	
Optic neuritis	11 "	14 "	
Optic atrophy	40 "	27 "	
Retinitis	2 "		
Chronic iritis	1 "		
Cataract	2 "		
Peripheral visual field contraction		3 "	
Central scotoma		3 "	
Anatomically proven compression at the chiasm without visual disturbance		12 "	(often with anosmia)

Bartels<sup>2</sup> records 22 cases with the following histories:

<sup>1</sup> *Loc. cit.*

<sup>2</sup> Bartels, *Zeitsch. für Augenheilk.*, Bd. xvi., 1906.

Bitemporal hemianopsia	23%
Unilateral temporal hemianopsia	23 "
Homonymous hemianopsia	9 "
Concentric contraction	22 "
Irregular contraction	4 "
Sector-shaped contraction	9 "
Central scotoma	13 "

In another series of 44 cases he records :

Bilateral simple optic atrophy	20 cases
Unilateral simple atrophy	1 case
Bilateral choked disk	15 %
Neuritis with subsequent atrophy	15 "
Normal fundus	10 "

Bartels thus gives temporal hemianopsia in 46% of cases while Uhthoff's two tables show only 38%. The important fact would seem to be that temporal hemianopsia is by no means essential to the diagnosis of hypophysis disease, and other eye symptoms are of greater importance. It is inevitable that the majority of cases will not be seen just at the time when a typical hemianopsia exists, and it is still more unlikely that both eyes will be affected in the same degrees. Undoubtedly too much stress has been laid upon this characteristic visual-field limitation, and greater familiarity with the subject will reveal hypophysis disease long before such a picture has been produced. Cushing<sup>1</sup> regards the visual-field limitation which eventually produces the picture of temporal hemianopsia as a fairly definite evolution. He says: "The primary defect usually involves the color boundaries alone in one upper temporal quadrant. This is followed by a more or less complete hemiachromatopsia, possibly with a 'slant' in the upper temporal form field, which gradually spreads downward until most of the temporal field is involved. In all cases the color fields are involved first, the form fields later. The macular area is often spared for a long time, but finally it becomes implicated in turn, first in its temporal half; finally the whole central area enters the blind field, and the nasal field in turn progressively shrinks away from the centre. It is to be emphasized that rarely are the two eyes affected in

<sup>1</sup> *Loc. cit.*

equal degree, and also that, after operation, restorations occur in reverse order."

Homonymous hemianopsia occurs in a fair proportion of cases and is explained by pressure at one side behind the chiasm, as may easily happen when the growth is in the hypophysis neighborhood ("hypophysengegend" of the Germans) and secondarily affects the hypophysis.

The tabulation made from Cushing's series exhibits numerous visual-field limitations, their variety emphasizing the importance of refraining from eliminating hypophysis disease from our thought just because the typical field of chiasmal pressure is lacking. Temporal defects short of hemianopsia must be regarded with suspicion, and color defects especially noted. J. Herbert Fisher,<sup>1</sup> in a report of 9 cases, has suggested that color loss is an index to the progress of the disease; and Cushing has treated at length the question of color interlacing in a variety of brain lesions producing increased pressure. This is a matter of especial import since the suggestion of hysteria when color interlacing is found may be encouraged by the rapid alterations of vision in cases of hypophysial cyst, as illustrated in Case I reported above. Daily variations in the fields are often observed, and their tendency through a period of weeks or months may be significant of the effects of glandular therapy, as maintained by de Kleijn.<sup>2</sup>

Amblyopia and amaurosis, like temporal hemianopsia, are the predominant findings in the early literature, as emphasized by Uhthoff. They represent late appearances which were the only diagnostic signs of pituitary disease known to the older ophthalmologists.

Primary optic atrophy is much more frequent than neuritis and secondary atrophy, owing to the location of the growth which presumably compresses Schwälbe's sheath, preventing the distension which ordinarily causes papilledema when intracranial pressure is excessive.

Ordinary neuritis, or the extreme degree manifested in choked disk, may occur and may be superimposed upon a

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<sup>1</sup>"The Pituitary Body and Lesions of the Optic Chiasm," *Trans. Oph. Soc. United Kingdom*, 1911.

<sup>2</sup>de Kleijn, *Graefe's Arch. für Ophthal.*, lxxx., p. 307.

primary atrophy when excessive intracranial pressure is a late and rapid development.

Scotomata are mentioned with comparative infrequency in the literature. Their appearance has even been taken to exclude the diagnosis of hypophysis disease. Bartels records them in 13 % of 22 cases; but obviously the cases are too few to allow any inference to be drawn. v. Frankl-Hochwart<sup>1</sup> records 1 scotoma in 31 cases. Uhthoff mentions central scotoma only 3 times among 328 cases. Patrick speaking from the neurological standpoint, and de Schweinitz and Holloway<sup>2</sup> speaking from the ophthalmological standpoint, have emphasized the comparative frequency of scotomata and their importance. The latter writers have recently presented the following classification:

1. Small and paracentral scotomata.
2. A quadrant up and out.
3. Scotomata varying in size and position.
4. Bitemporal hemianopic scotomata.
5. Scotomata in the temporal field at some distance from the fixation point.
6. Blurred vision, unexplained by any ophthalmoscopic lesion.

These scotomata may be absolute or relative and may all be the beginning of larger defects which will eventually become hemianopsias.

In view of the multiplicity of eye symptoms which may indicate pituitary disease we are warranted in keeping in mind this possibility and hoping for more early diagnoses than we have heretofore made.

I desire here to express my gratitude to the colleagues whose names have been mentioned, for their generosity in placing their material at my disposal and for aid in the study of the cases.

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<sup>1</sup> v. Frankl-Hochwart, *Wien. med. Woch.*, 1909, Heft 37-39.

<sup>2</sup> Section on Ophthalmology, Amer. Med. Assoc., 1912.



Mye, Bal, Nose & Turner

ILLUSTRATING DR. DE SCHWEINITZ'S ARTICLE ON "EPIBULBAR  
CARCINOMA; HISTOLOGIC EXAMINATION OF THE SPECIMEN."



FIG. 1. Section of eyeball showing position of epibulbar growth.

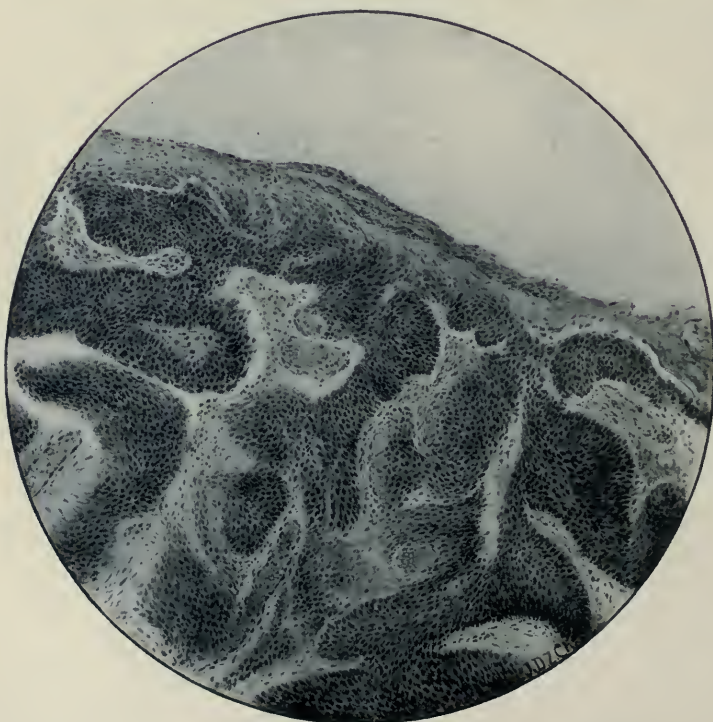


FIG. 2. Primary epibulbar carcinoma; microscopic appearances.

## EPIBULBAR CARCINOMA; HISTOLOGIC EXAMINATION OF THE SPECIMEN.<sup>1</sup>

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(With two illustrations on Text-Plate VIII.)

**A**LTHOUGH the subject of epibulbar carcinoma has occupied the attention of ophthalmic pathologists and clinicians, and elaborate studies of this type of neoplasm are on record, it may not be out of place to describe the history and microscopic examination of the present specimen.

*History.*—A man, aged thirty-four, came to the University Hospital on November 4, 1912, for the examination and treatment of an epibulbar growth of the left eye. In childhood the patient had measles, chicken-pox, and whooping-cough, and in later years pneumonia, malaria, and typhoid fever. He admits Neisserian infection, and also that at the age of twenty-three years he acquired a lesion, which probably was the initial lesion of syphilis. Born in California, the patient has lived in various parts of this country and for the last three years in Philadelphia. His occupation is that of a packer in a vacuum-cleaning establishment. He is married, has one child living and well; his wife has had four miscarriages. His habits are good; he smokes moderately and occasionally drinks beer, but not to excess. The patient's father died of unknown cause; his mother is living and well; two brothers are alive and in good health. There is no history of tuberculosis or neoplasm in the immediate family or among relatives with whom he is acquainted.

*History of the Present Condition.*—In 1898 the patient noted a small yellowish-white papular growth the size of a split pea at the inner corneal margin of the left eye. The

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<sup>1</sup> Read before the American Ophthalmological Society, Washington, D. C., 1913.

surrounding blood-vessels were injected, but there was neither pain nor disturbance of vision. This growth remained stationary for about three years. Eleven years ago he applied at the dispensary of the Pennsylvania Hospital for treatment, and there the lesion was cauterized with the actual cautery. Following this cauterization he reports rapid enlargement of the growth, so that it soon covered one-third of the pupil space. For a period of four years the neoplasm remained quiet and did not grow in size, when, following what he calls cold in the eye, the growth began to increase in size, and by the year 1907 had covered the whole front of the eye to such an extent that it protruded between the lids and in appearance reminded him of a large strawberry. One year ago this protruding mass underwent a species of softening and liquefaction, and soon developed the appearances which were present at the time of examination.

*Physical Examination.*—The patient has neither cough nor night sweats, the appetite is good, the bowels are regular and their palpation reveals no abdominal growth of any description. Examination of the urine was practically negative, with the exception of a few oxylate of lime crystals. The blood count was as follows: Red blood corpuscles, 5,220,000; white blood corpuscles, 6,300; hemoglobin, 90. There was no eosinophilia; polymorphonuclear leukocytes, 91; leukocytes, 8. Careful examination of the nasopharynx and accessory sinuses failed to reveal anything except a slight nasal catarrh. The Wassermann test was positive; Von Pirquet's test was negative.

The vision of the right eye was normal, and it showed no abnormalities of any character. The entire front of the left eye, the vision of which was faint light perception, was covered with a thick, grayish-yellow or, more accurately, reddish-yellow mass, very closely resembling granulation tissue, the center of which was somewhat umbilicated and contained some sloughing detritus. The eyeball movements were normal and palpation failed to reveal any growth in the deeper portion of the orbit.

The eyeball was enucleated on November 12, 1912, and exploration of the orbit after enucleation failed to reveal the presence of any suspicious tissue. In due course an artificial eye was adjusted, but at the expiration of three months the patient returned with the tissues of the orbit much swollen, and in the upper and inner portion of the cavity an indurated mass was visible, evidently representing a recurrence of the growth. Thereafter a complete exenteration of the orbit was performed, healing was entirely kind, and up to the present time, eight months after the operation, there has been no sign of recurrence.



*Macroscopic Examination.*—The anterior segment of the eyeball is covered by a tumor mass, which measures 27mm across, and extends backward along the outer surface of the sclera a distance of 6mm on the temporal and 4mm on the nasal side. The growth appears to consist of two lateral masses, one on either side of the former site of the cornea; the portion on the nasal side has a thickness above the sclera of 8mm, that on the temporal side of 5mm. Between them is a depression where the cornea has been replaced by a faintly staining tissue, which measures 2mm in thickness. The lens is displaced forward and to the temporal side, pulling the ciliary body away from its scleral attachment. The retina is totally detached (Figure 1).

*Microscopic Examination.*—The tumor surface is covered by a layer of flattened epithelial cells, which have undergone horny change, their nuclei no longer staining with the hematoxylin. The tumor substance is composed of broad processes of cells in direct connection with, and extending backward from, the surface epithelial cells, the stroma being a dense connective tissue, which has developed from the sclera and episcleral tissues.

The cell masses extend in various directions, some of the processes being cut longitudinally, some transversely, and some obliquely. The outermost cells of the columns stain deeply, and are columnar in shape; toward the center, well-marked changes in the cells are in evidence, due to nuclear degeneration. The cells become larger and vacuolated, the nuclei stain faintly, and the chromatin is much reduced in amount. In places the central cells are flattened, and tend to form typical pearls, but there is no definite keratinization. Careful focussing shows also occasional prickly cells, and while the cell form varies a great deal, becoming spindle-shaped in certain positions where the growth has been rapid, there is no intracellular substance, and the tumor is unquestionably a squamous-celled type of carcinoma, developing from the conjunctiva (Figure 2).

The cornea, except for a few of the posterior lamellæ, has been replaced by a dense connective mass, composed of bundles of fibrous tissue running in various directions, in which there are comparatively few blood-vessels. The columns of epithelial cells extend into this tissue from the temporal side, and have invaded it to a point a short distance in front of Descemet's membrane. The columns of cells here are narrower than in lateral portions of the tumor. On the side next to the nasal mass there is an area which is free from carcinoma cells, but which is densely infiltrated with leukocytes, chiefly of the polymorphonuclear type. In this portion the surface epithelium is absent, the tissues

are necrotic, contain very few staining elements, aside from the leukocytes, which are also undergoing degeneration, and the condition is evidently due to surface ulceration, with infection of the underlying tissue. The posterior corneal lamellæ are irregular, but Descemet's membrane is intact, and shows no sign of perforation. The sclera has resisted the penetrating cells, and the main mass of the tumor has progressed backward along its outer surface as far as the insertion of the recti muscles. On the nasal side there is beginning involvement of the perivascular spaces of the perforating ciliary vessels, but the interior of the eyeball is free from invasion. The base of the growth, especially at the position where it is advancing backward along the sclera, is deeply infiltrated with round cells, chiefly of the mononuclear type, which represent the usual reaction of the organ to the presence of the malignant growth. The episcleral vessels are widely dilated and there are numerous hemorrhages, some of them being of considerable standing, showing masses of blood pigment.

The crystalline lens is pushed forward, especially on the temporal side, where the anterior chamber is abolished, and the iris here is in contact with the posterior surface of the cornea. The lens shows no pathologic changes. On the nasal side, the ciliary body has been torn away from the sclera by the displacement of the lens, the iris and ciliary body on this side being adherent to the lens capsule in front of and behind the equator. The retina is detached and passes forward to the posterior pole of the lens.

The iris shows a chronic iritis, indicated by its infiltration with mononuclear round cells, especially along the vessels; the stroma and the sphincter muscle are atrophic. The ciliary muscles are also atrophic; the vessels of the ciliary processes and choroid are hyperemic. The retina is entirely atrophic, being converted into a dense connective-tissue cord, from which all nervous elements have disappeared, and is irregularly infiltrated with pigment from the retinal pigment cells, particularly along the thickened blood-vessel walls. The optic nerve is atrophic, the nerve-bundles being reduced in diameter, and the septa considerably increased in thickness.

The recurrence in the orbit consists of a nodule 9mm in diameter, composed of orbital tissue, which has been partly destroyed by columns of epithelial cells, running in various directions. The cells resemble those of the deeper cells of the surface epithelium of the conjunctiva. There are many mitotic figures, a moderate amount of karyorrhexis of the nuclei of the cells, in the center of the infiltrating process, and round-celled infiltration of the

orbital tissue in advance of the growth. Epithelial pearls are absent, but prickle cells can be made out.

The pathologic examination has, therefore, confirmed the clinical diagnosis of *primary carcinoma of the conjunctiva*, beginning at the limbus. It may possibly have started as a papilloma, and, as the result of cauterization, may have been stimulated to rapid growth and then assumed a malignant type.

Primary carcinoma of the bulbar conjunctiva cannot be said to be of common occurrence, although a good many cases are now on record. In 1908, Rschanitzin searched the literature in Michel's *Jahresbericht*, and found 502 cases of conjunctival tumors. His classification includes 250 benign and 252 malignant growths. Of the malignant forms, 149 were carcinomas and 103 were sarcomas. Primary carcinoma of the bulbar conjunctiva is less frequent than carcinoma of the eyelid, secondarily involving the eyeball. The literature of the subject up to the year 1904 may be found in Saemisch's article on "Diseases of the Conjunctiva," in the second edition of the *Graefe-Saemisch Handbuch der Gesamten Augenheilkunde*,<sup>1</sup> and from 1904 to 1910 in an article by Heilbrun, in *Graefe's Archiv f. Ophthalmologie*.<sup>2</sup> An examination of the *Jahresbericht* and the *Index Medicus* has revealed a few more reports, reference to which will be found at the end of this paper.

Of practical importance in connection with these growths from a clinical standpoint is invasion of the eyeball. Some authors, for example, Axenfeld, Greeff, Wintersteiner, and Saemisch, consider that they rarely penetrate the globe, while Ginsburg and Parsons express an opposite opinion. Ischreyt in 1906 reviewed the subject carefully, and tabulated 47 cases from the literature. He assumed that there was perforation where the invading cells had reached the inner surface of the sclera or the region of Schlemm's canal, even where the anterior chamber was not involved. In 17 of the 47 cases perforation had actually occurred, a percentage of 36.1. In the literature since 1906 we have been able to find the reports of six additional cases of epibulbar carcinoma, and in three of

<sup>1</sup> Volume v., p. 677.

<sup>2</sup> Bd. lxxvii., 1910, p. 541.



them perforation of the globe was demonstrated. In 53 eyeballs, therefore, perforation occurred in 20, or 37.6 per cent. Hence, although the cornea and sclera offer a considerable resistance to the growth of the tumor, especially if Bowman's membrane be intact, it is evident that perforation occurs in a considerable number of cases, especially if the neoplasm has been present for a long period of time.

Frequency of perforation depends largely upon the site of the tumor. It has been found that those growths which are situated at the corneal limbus are much more apt to penetrate the globe than those placed at a distance from it, and, as is well known, the region of the penetrating ciliary vessels presents a feeble resistance to a growing carcinoma, because its cells invade the tissue along the perivascular lymph-sheaths. This fact is of great importance in determining the proper surgical procedure in any given case. Should the carcinoma be situated at the limbus, and should it be of very small size, deep excision may be practised, but only if the patient can be kept under prolonged observation. Growths at a distance from the limbus may be excised, with less danger of recurrence. It is true, however, that in the majority of cases the tumor is situated at the limbus. The epithelium changes in character in passing from the conjunctiva to the cornea, and, moreover, has a tendency here to send in irregular processes, as was shown particularly by Nakajawa. In this position, too, the growths are liable to injuries, often of a trifling character, but many times repeated. According to Lagrange, implication of the lymphatic glands in the neighborhood is rare, but occasionally occurs. Parsons says that the preauricular glands are first affected, and the submaxillary glands later. The existence of such a glandular involvement would be an absolute indication for enucleation, which, indeed, must be performed in the great majority of cases.

Another point of interest in connection with our case is the age of the patient. As a rule, this form of carcinoma is most frequently found in individuals over forty years of age. In 7 patients with epibulbar carcinoma, collected by Rogman, the ages respectively were twenty months, twelve years, thirteen years, nineteen years, twenty-seven years, thirty-



five to forty years, and thirty-seven years. The case-histories of other patients have since been reported by Hartmann (twenty-nine years), Bianchi (twenty-eight years), and Heilbrun (twenty years). As the growth first appeared in the present instance fifteen years before the operation, it must have originated when the patient was nineteen years of age.

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## TOXIC AMBLYOPIA DUE TO TOBACCO ALONE.<sup>1</sup>

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**I**N presenting this case to you I wish to call attention to the etiology, and to the unusually good result obtained by prolonged treatment.

A. B., 65 years of age, consulted me on August 2, 1911, because of a blurring of vision that had persisted for eight or ten months. He had been an inveterate smoker for many years, was seldom without a pipe in his mouth for any great length of time. He stated that he had occasionally drank a glass of beer when a young man, but that he had drank no intoxicating liquors of any kind for over forty years, and that he did not indulge in patent medicines. He gave no history and presented no symptoms of syphilis, multiple sclerosis, or of any other organic disease of the central nervous system, aside from the trouble in his optic nerves and the fact that he frequently felt dizzy after smoking. He had worn +1.75 D. sph. for distance quite a number of years; with this glass the vision of his right eye was  $\frac{20}{70}$ , that of his left  $\frac{20}{60}$ ; without it the central vision of each eye was reduced to counting fingers at four feet. A central scotoma for red was present. The temporal side of the head of each of the optic nerves was so very white that I did not hesitate to record it in my notes as atrophy of the papillomacular bundle of nerve fibres.

The most essential part of the treatment was the immediate and total abstention from tobacco in any form. In addition to this, strychnine nitrate was injected subcutaneously, beginning with a small dose, which was increased daily until physiological symptoms were obtained. The amount required to induce these symptoms in this patient was  $\frac{1}{5}$  of a grain. From that time on  $\frac{1}{6}$  of a grain was

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injected subcutaneously twice a week for eleven months, the patient taking at the same time  $\frac{1}{16}$  of a grain of strychnine sulphate by mouth three times a day.

The vision of his worse eye, the left, improved within two weeks to  $\frac{2}{20}$  with the glass he was wearing. After that the improvement was slow but constant. At the end of six months the vision of his left eye was  $\frac{2}{20}$  with +1 D. sph. +1 D. cyl. axis 180°; that of his right eye was even better; at the end of one year it was  $\frac{2}{20}$  in each eye with the correction; R. +1 D. sph. +.75 D. cyl. axis 180°; L. +1 D. sph. +1 D. cyl. axis 180°. At this time the appearance of the fundus was normal, and no affection of the papillomacular bundle could be seen. On March 3, 1913, eight months after the discontinuance of treatment, the vision of the right eye was  $\frac{2}{20}$ —, that of the left  $\frac{2}{20}$ —, with the correction given above, but objects seemed a little “fuzzy” when seen with the left eye in comparison with their appearance to the right. No central color scotoma could be detected in the right eye, but a minute central scotoma for red was present in the left.

Adam says in his *Ophthalmologische Diagnostik*, published in 1912, that it is doubtful if tobacco alone is competent to induce disease of the papillomacular bundle of optic-nerve fibres. “Ob Nicotin *allein* eine derartige Einwirkung haben kann, ist zweifelhaft.” This statement voices a feeling that is, I think, rather widespread, and is by no means inexplicable. Most men drink alcoholic beverages more or less, relatively few are total abstainers, and it is probable that the proportion of the latter is still smaller among men who use tobacco. It is generally admitted that the habitual use, or rather abuse, of alcohol and tobacco together is able to excite a disease of the papillomacular bundle of fibers in the optic nerve, that the proportionate quantities of the two necessary to induce this disease varies a great deal in individuals, and that total abstinence from both is needed for a cure. We also know that habitual drinkers are not always perfectly truthful, so that when we see a patient with toxic amblyopia who admits that he uses tobacco to excess, but denies that he drinks, we question at once whether he is telling the truth about the latter. In the majority of cases we are unable to answer this question. On one occasion I sent a patient whose word I doubted to a physician to have his stomach examined, and

received a report which seemed to indicate clearly an alcoholic gastritis, but we cannot always have recourse to such an expedient. If we wish to investigate we have usually the difficult task of proving a negative. Absolute, incontrovertible proof that a man does not drink any form of alcoholic beverage can hardly be obtained, for this would require incontestable evidence covering every moment of the day and night for a long period of time, but I think it will be accepted as the best possible negative evidence if it can be shown that a man has lived many years in the same community, has been well known, and has maintained the reputation of a total abstainer during that time. I think that everyone will agree that it would not be possible for a man to live forty years in a small community, maintain the reputation of a total abstainer, and yet drink alcoholic liquor in sufficient quantity and with sufficient regularity to excite a toxic amblyopia. In order therefore to ascertain the facts in regard to this patient I inquired of a number of people who had been acquainted with him for years, including his family physician, and learned that he was well known in the community, had lived there nearly his entire life, and that none of them had ever known him to drink, or had ever heard of his having done so. His reputation as a total abstainer seems to be absolutely spotless. This is therefore a case in which a well marked disease of the papillomacular bundles of optic-nerve fibers developed in a man who had smoked excessively for many years, during which he had not been known to drink any form of alcoholic beverage. Inasmuch as this disease recovered after total abstention from tobacco, as no signs of multiple sclerosis, or of any other disease of the central nervous system could be detected in the course of a year, and as he has continued to enjoy good health and good vision since the cessation of treatment, the evidence seems to be sufficient to prove that tobacco alone was the exciting agent. A single case of this kind is enough, I think, to prove that tobacco *alone* is competent to cause the lesions characteristic of toxic amblyopia.



## OPHTHALMIA IN THE FORM OF CONJUNCTIVAL PATCHES.

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THERE have been observed on the conjunctiva, outside of the clinical manifestations which are caused there by acute infectious processes, the characteristic appearances of xerosis, spring catarrh, tuberculosis, syphilis, molluscum-contagiosum, small-pox, pemphigus, conjunctivitis-petrificans, and ophthalmia-nodosa. There are also known, various degenerative processes of this mucous membrane, as well as congenital and acquired anomalies of its development. All of these diseases of the conjunctiva have distinct clinical appearances, and their minute structure has been studied, from a histo-pathologic and histo-chemical point of view, as well as from the bacteriological and embryological side.

I had the opportunity to observe a special form of conjunctival disease, which I have called "ophthalmia in the form of conjunctival patches," because it has distinct clinical manifestations, which differ from those conjunctival diseases mentioned above.

I was able to follow up this ophthalmia during its entire clinical course, and to study its histo-pathology by means of experimental examinations. Based upon these examinations, I offer a method of treatment for this disease.

## I.

## CLINICAL HISTORY.

L. C., from Dorno Lomellina, single, 22 years of age, is normally built. Menstruation was always normal. Parents and three brothers are alive, and have never had any eye trouble.

The patient had typhoid at the age of 8 years, with a relapse at the age of 10. She had repeated attacks of malaria and influenza. At the age of 17, she had a pleurisy.

She worked in rice-fields, and, later on, as a domestic. On November 16, 1903, she developed a conjunctivitis of the right eye, while working in the field, which she ascribed to the entrance of dust into the conjunctival sac. This was accompanied by a sensation of burning, lachrymation, photophobia, pain in the eyeball, neuralgia in the distribution of the first and second branches of the fifth nerve, and fever.

The attending physician cured the conjunctivitis with a bichloride solution 1:5000, but there remained white patches on the conjunctiva, and a feeling of discomfort in the eye. I saw the patient for the first time, in the eye clinic at Pavia, on January 11, 1904.

The eyelids are normal. On the conjunctiva of the fornix, of the tarsus of the lower lid, and on the lower half of the bulbar conjunctiva, there are seen white patches of various sizes. During the various periods, when the patient stayed in the clinic, I was able to follow, very carefully, the cycle of evolution of these recurring patches.

*Prodroma.*—The conjunctival disease was ushered in by a neuralgia of the first and second branches of the fifth nerve, accompanied by fever, for three or four days, not exceeding  $37.8^{\circ}\text{C}$ ., in the axilla. There was a burning sensation in the eye, with marked photophobia, and an otitis of the opposite side. Very often, menstruation set in at the same time.

*Symptoms.*—On the conjunctiva of the right eye, which was the first to be affected, there was observed, in the first twenty-four hours of the affection, congestion of the tarsal conjunctiva and the bulbar conjunctiva. There were photophobia, lachrymation, and slight secretion.

With a strong convex lens, there could be seen at this time, on the conjunctiva of the lower lid, white dots, about 0.1mm in diameter, either scattered, or collected into small groups. In the course of a few days, these points increased in number, forming small snow-white patches, arranged mostly in groups of three. Each patch had a diameter of

about  $0.5\text{mm}$ , and was rounded or slightly oval in outline. These spots, by growth or by coalescence with neighboring spots, formed large white oval or irregular patches (Fig. 1). The largest spots were  $3\text{--}7\text{mm}$ , and the smallest  $2\text{--}4\text{mm}$ .

The spots were situated on the tarsal conjunctiva, the fornix, and the lower half of the bulbar conjunctiva. The patches on the tarsal conjunctiva often reached the margin of the lid, and the mouths of the Meibomian glands. The patches were raised not more than  $0.5\text{mm}$  above the surface of the conjunctiva. None of the spots was ulcerated on the surface, nor was there any desquamation, or contraction of tissue.

If the patches were lightly rubbed with cotton or lightly scraped with a Daviel spoon, no change could be seen. When the patches were so violently scraped that they were torn, they could be partly lifted away, with portions of the adjacent conjunctiva. If a spot was removed with the scissors, the tissue at its base appeared whitish, in the form of a rounded droplet, and the connective-tissue bundles also showed white areas. After complete development of the patches, the hyperæmia of the conjunctiva gradually disappeared. The time required for the development of this disease was from twenty-eight to forty-four days.

(1) The developmental period of the patches was about eight to twelve days. This period was shorter when otitis or menstruation occurred at the same time.

(2) The stationary period, during which the patches, having reached their highest point of development, remain unchanged, lasts about eight to twenty days.

(3) The retrogressive period lasts about twelve days. During this period the patches changed, first in the center to a whitish gray, sometimes slightly yellowish, the white borders appearing more prominent. Then the spots gradually diminished in size.

The development of the patches caused no shrinkage of the conjunctival sac. The portions of the conjunctiva which were not covered by patches had a normal appearance and thickness.

In general, the development of the spots was restricted to one eye, usually the right, and the relapses occurred during five years, from one to three times a year. During the last relapse, which occurred in 1908 in the right eye, there developed, for the first time, on the lower half of the bulbar conjunctiva of the left eye, near the fornix, an oval white patch,  $2.5\text{mm}$  in its greatest diameter, and another smaller patch in the tarsal conjunctiva, near the edge of the upper lid. While the conjunctivæ of both eyes were affected the corneæ remained clear. The iris was normal. The

pupillary reaction was normal, and the intraocular tension was normal. The eye grounds were normal.

Of the ten relapses in the right eye, seven occurred in winter, two in the fall, and only one at the beginning of summer. The first occurrence in the left eye occurred in winter.

In 1905, she was treated for cervico-endometritis and right-sided ovario-salpingitis, probably gonorrhœal in origin, in the University Gynecological Clinic in Pavia.

During all of the attacks, the examination of the urine and blood was negative. Menstruation was normal, there were no miscarriages, and in 1908, she bore a full-term healthy child, and was kept as a wet-nurse in the foundling asylum at Pavia.

## II.

### HISTO-PATHOLOGIC FINDINGS.

*Histological Examination.*—The excised patches were hardened in absolute alcohol, in Flemming's fluid, in sublimate, and in formol. The sections were stained with neutral carmine, with carmine alum, according to Grenacher, with Weigert's picrocarmine, with Busch's hæmatoxylin-eosin, with Unna-Taenzer's acid fuchsin, with Unna-Taenzer's acid orcein, with Weigert-Bizzozero-Ehrlich's hæmatoxylin, with Fischer's eosin, with osmic acid, with Sudan III, with Pappenheim's stain, and with Nicoltes' thionin.

The histological examination of the patches gave the following results: The epithelium of the bulbar conjunctiva is almost everywhere of normal thickness (Fig. 2a, Fig. 4a); in a few places, in the tarsal conjunctiva and the fornix (Fig. 2b), it is somewhat diminished in thickness. In the upper and middle layers of the epithelium, there are scattered lacunæ, containing remnants of epithelial cells and polynuclear leucocytes; cells in the process of karyokinesis are seen in the middle layers; there is infiltration of lymphocytes in various epithelial layers.

The changes in the connective tissue are identical in the patches on the scleral conjunctiva and in those of the fornix and the tarsus. There is seen, in the connective tissue under the epithelium, a marked infiltration with mononuclear leucocytes (Fig. 2c), seldom with polynuclear leucocytes;



in some areas there are numerous mast cells (Fig. 3a, Fig. 4b); there are very few plasma cells. The leucocytic sub-epithelial infiltration is not more marked than the accumulation of connective-tissue cells.

The connective-tissue bundles in the middle of the stroma of the patches are mostly split, or form a loose network (Fig. 3b), with wide lymph spaces (c); between the connective-tissue bundles, there are mast cells (d), which are numerous in some regions, but fewer in number near the vessels; there are also seen, here, a few plasma cells and fat-cells arranged in series.

In the middle and deeper layers of connective tissue, mast cells are seen (Fig. 4c), either singly or in groups, of larger volume and irregular polyhedral form. In these groups, the nuclei have a shining gold-yellow color. These nuclei cannot be stained either with the various hæmatoxylin, with carmine, or by Pappenheim's method.

In the advanced pathological process, the mast cells seem to be reduced to granules, which lie in the interstices of the connective-tissue stroma, and mingle with the yellow granules (Fig. 4d), and with the fine pale white granules, which take their origin from the changed blood-elements, and are scattered in little heaps in the interstices of the connective tissue. In sections, these yellow and white granules, treated with a 20% aqueous solution of potassium-ferro-cyanide, give a positive reaction for hæmoxiderin, turning light blue.

With Ehrlich's hæmatoxylin, they became pale blue; with Weigert's picrocarmine, they became gold yellow; with carmine-alum, black; with acid-fuchsin, the yellow granules retained their color.

Most of the vessels are dilated; the adventitia of the arteries and veins is infiltrated with mononuclear leucocytes, plasma cells, and mast cells. The epithelium of the intima of many of the large and small veins shows a dark yellow pigmented protoplasm (Fig. 5a). The nuclei contain no pigment. The lumen of the vessel shows, in some cases, altered blood-elements and a network containing a few leucocytes and some pale glittering granules, which also occur outside of the vessel, in the adjacent connective tissue.

In the connective tissue of the patches which lie in the

tarsal conjunctiva, there are seen, near the roots of the lashes and the Meibomian glands, accumulations of fat-cells, arranged in rows, while the lashes with their sebaceous glands, the Meibomian glands, and Krause's glands show no pathologic changes.

#### HISTO-CHEMICAL EXAMINATION.

(1) Reaction for fatty degeneration.—With Sudan III, the deeply situated connective-tissue bundles of the patch take on a pale orange color; some become waxy in color. With osmic acid, the reaction is positive in circumscribed spots in the connective-tissue stroma of the conjunctival patches of the fornix and tarsus.

(2) Reaction for glycogenic degeneration.—Negative with iodine and KI, as well as with rosanilin mur.

(3) Reaction for amyloid degeneration.—With iodine-green, the connective-tissue bundles in some of the sections became pale violet. This is positive proof of circumscribed amyloid degeneration, because the remainder of the sections showed a negative reaction, viz., dark blue and in some places green.

(4) Reaction for hyaline degeneration.—Negative.

(5) Reaction for mucous degeneration.—On staining with muco-hæmatin, the mucous degeneration was shown to be limited to a few points in the epithelium.

#### BACTERIOLOGICAL EXAMINATION.

A—With smear preparations, taken with a platinum loop from the surface of the conjunctival patch, and stained after Ziehl and Gram, there were found staphylococci, arranged like bunches of grapes.

B—In sections stained after the method of Pick-Jackson (methylene blue and carbol-fuchsin) and after the method of Ziehl, the staphylococci were seen scattered on the surface of the epithelium covering the patches.

Examination for spirochæta pallida after the methods of Giemsa and Levaditi were negative.

C—Cultures were made from material obtained with a platinum loop from the surface of the patches. The cultures were made on potatoes, agar-serum, gelatine-serum, and

bouillon. On potatoes and agar-serum, the staphylococcus albus was grown. In gelatine-serum and bouillon the cultures were negative.

In 1908, cultures were made in the same media, by placing a portion of the patch into the medium. As in the previous cultures, there was developed the staphylococcus albus on potatoes and agar-serum.

D—Inoculations of positive culture material into the conjunctiva and cornea of guinea-pigs. With a sterile discission-needle, the pure culture of staphylococcus albus in agar-serum was carried over into the conjunctiva of the globe and fornix as well as into the cornea of healthy guinea-pigs. In each guinea-pig, the material was injected into the cornea of one eye and the conjunctiva of the other. For twenty-four to thirty hours after the inoculation into the bulbar conjunctiva, there was seen the mark of the trauma, with a slight reaction. In the fornix nothing could be seen. On the cornea, a traumatic ulcer with a grayish margin appeared, which, in the following days, took on the appearances of a superficial ulcer with a grayish base. There was no iritis.

Ten to twenty days after the inoculation, nothing was to be seen on the bulbar conjunctiva and the conjunctiva of the fornix. The corneal ulcerations cicatrized after the thirtieth day, leaving a white macule. Bacteriological examination of the grayish material in the corneal ulcers showed the presence of staphylococcus albus in small numbers.

### III.

It has been determined by ophthalmologists that the conjunctiva participates in the pathological processes of roseola, scarlatina, and small-pox, just like the other mucous membranes. During these diseases there are seen in the conjunctiva, hyperæmia, catarrhal and purulent manifestations. Hay-fever is accompanied by an intense acute conjunctivitis. Trousseau described a variety, a periodic conjunctivitis, which occurred in a twenty-two-year-old woman a month after the onset of the hay-fever. In this patient there occurred, before the development of the conjunctivitis, dry eczema, localized edema, urticaria, hay-fever once a year, gastro-pyloric disturbances, and muscular or

articular rheumatism. The conjunctivitis was preceded by nausea, migraine, edema of the scalp and other parts of the body, in the form of plaques. Then the bulbar conjunctiva became reddened, and there were noticed grayish-pink elevations, which spread out under the lids. These nodules always lay near the fornix, and fused into a mammillary-shaped prominence, 6mm wide and 3-4mm high. On the contiguous conjunctiva, the papillæ were hypertrophied. The prominence was freely movable on the eyeball, and was insensitive to pressure. There was no conjunctival secretion. The mass usually disappeared in fifteen to twenty days, sometimes in one to two months. The urine always contained a large amount of uric acid.

Microscopic and bacteriological examination excluded tuberculosis. The connective tissue was infiltrated with mononuclear leucocytes, which were arranged in nodules around the vessels and mast cells. There were new-formed blood-vessels, which lay upon the epithelial layer. Trousseau concluded that it was rather a nutritive disturbance than an infection.

*Differential Diagnosis.*—Ophthalmia in the form of conjunctival patches differs from the following conjunctival affections:

(1) From membranous, non-diphtheritic conjunctivitis with the presence of staphylococci or streptococci, and from membranous diphtheritic conjunctivitis, with the presence of the Loeffler bacillus: (a) through the clinical and anatomical appearances, as the conjunctival patches were never covered by a membrane, and were produced by histologic and histo-chemic changes of the tissues of which the conjunctiva is composed; (b) by the lessened virulence of the staphylococcus albus, when inoculated into the conjunctiva and cornea of guinea-pigs, as the same organisms were found in almost pure culture by Jessop in the membranes of certain non-diphtheritic membranous conjunctivitides, with intense virulence; although it must not be forgotten that the same staphylococcus albus was found by various observers (Pick, Gayet, etc.) in the normal conjunctiva.

(2) From pemphigus, by the fact that in ophthalmia in the form of conjunctival patches there are no vesicles containing



fluid, no ulcers, and no shrinkage of the conjunctival sac, and because the cornea was not involved by the disease.

(3) From erythemata, mucous patches, gummata, and syphilitic ulcers, by the clinical manifestations, the histologic and histo-chemical structure, as well as the negative findings as regards the spirochæta pallida. Furthermore, the history and examination of the patient were negative as regards syphilis. The patient never aborted, and was delivered of a healthy child. Finally the condition was not influenced by mercurial treatment.

(4) From tuberculous conjunctivitis, by the clinical picture, by the absence of ulcers or losses of substance, by the histologic findings, and by the normal condition of the cornea, in spite of its being in contact with the patches on the tarsal conjunctiva.

(5) From conjunctivitis nodosa, by the histologic structure and the clinical picture, as ophthalmia in the form of conjunctival patches never involves the episcleral tissues or the iris.

(6) From spring catarrh and Parinaud's conjunctivitis by manifestly different appearances.

*Prognosis.*—Ophthalmia in the form of conjunctival patches never involves the cornea, or extends to other parts of the eye. The visual functions of the eye remain normal. There were several relapses every year. The relapses occurred most commonly in the late fall and winter. At the beginning of a relapse, the patient was usually in a run-down condition.

*Outcome.*—At the end of a regression, the patches become somewhat smaller. Their seat becomes a dark gray. The patches never disappear altogether.

*Treatment.*—(a) Internally, quinine and arsenic were given for the neuralgia, headache, and otitis. (b) Locally, the patches were washed with bichloride 1:5000. A mild conjunctivitis, occurring during one relapse, was treated with 1.5% silver nitrate. (c) Although the patient gave no evidence of syphilis, she was given antisymphilitic treatment, locally, by means of subconjunctival bichloride injections under the patches, and generally by means of subcutaneous bichloride injections. This treatment had no effect on the condition. (d) The patches were excised.

Excision of the patches in the right eye did not prevent the development of fresh patches, but the excision of the patch in the left eye has cured that eye completely. There has been no recurrence in that eye for two years.

#### CONCLUSIONS.

The ophthalmia in the form of conjunctival patches, observed by me, differs in clinical appearances, pathogenesis, pathologic, histo-chemic, and bacteriologic findings, from conjunctivitis, pemphigus, syphilis, tuberculosis, ophthalmia nodosa, spring catarrh, and Parinaud's conjunctivitis.

The cornea, sclera, uvea, retina, and optic nerve, as well as the visual perception, remained normal.

No pathogenic connection could be found between the febrile prodromal stage and the development of the conjunctival patches. Ophthalmia in the form of conjunctival patches is caused by degenerative changes of its tissues; in the epithelium covering the patches, there is mucous degeneration. There are uncertain evidences of slight amyloid degeneration. There was some fatty degeneration near the Meibomian glands. Some of the mast cells were in a state of degeneration, as well as some of the blood-elements in the vessels and in the connective tissue.

Bacteriological examination showed the presence of staphylococcus albus. Pure cultures of the staphylococcus albus, inoculated into the conjunctiva and cornea of the guinea-pig, did not reproduce either the clinical form or the pathological changes of this form of ophthalmia.

Bichloride injections under the patches and subcutaneously had no effect on the condition.

The best treatment for this condition is the following:

In the period of development: instillation into the conjunctival sac of (a) a 4% boric acid solution, or bichloride 1:5000; (b) when there is much photophobia, instillation of 1% pilocarpine mur.; (c) permanent bandage; (d) when there is pain in the eye, instillation of cocain or tropococain 3½ %, and the internal administration of quinine and arsenic.

In the retrogressive stage: continuation of the above mentioned antiseptic instillations, without the bandage.

The operative removal of the patches which are surrounded by other patches is not to be recommended, as this is usually followed by the formation of new patches in the neighborhood. If, however, only one, or a few patches exist in an otherwise healthy conjunctiva, the prompt removal of the patch or patches may cure the condition and prevent relapses.

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# EXPLANATION OF THE PLATES.

FIG. 1. Clinical picture of ophthalmia in the form of conjunctival patches, with its localization in the conjunctiva of the globe, tarsus, and fornix. About double enlargement.

FIG. 2. Horizontal section of a patch, which lay partly in the conjunctiva of the fornix, and partly in that of the globe. Stained after the

method of Pappenheim. Zeiss, Ocul. compens. 8. Tube raised 16mm. Obj. aa. Small drawing apparatus of Abbe. Drawing tablet after Bernhard. (a) Epithelium of normal thickness in that portion of the patch which lay in the bulbar conjunctiva; (b) Epithelium reduced in thickness, in that portion of the patch situated in the fornix. Intense subepithelial infiltration with leucocytes, and presence of mast-cells.

FIG. 3. Horizontal section of a patch in the bulbar conjunctiva. Stained after Pappenheim. Zeiss, Ocul. compens. 18; tube raised 16mm. Obj. apochrom. DD.

- (a) Mast-cells in the subepithelial infiltration of leucocytes.
- (b) Split bundles of connective tissue and wide lymph-spaces (c).
- (d) Connective-tissue bundles with mast-cells.

FIG. 4. Horizontal section of patch on bulbar conjunctiva. Stained after Pappenheim. Zeiss. Ocul. compens. 18. Tube raised 16mm. Obj. apochrom. DD.

- (a) Normal epithelium.
- (b) In the middle and deeper layers of the connective-tissue stroma. Mast-cells which show a part of their golden-yellow granules.
- (d) Accumulations of golden-yellow granules in the connective tissue.
- (e) Fine pale granules in the connective tissue.

FIG. 5. Horizontal section of portion of patch in conjunctiva of fornix. Stained with acid fuchsin after the method of Unna-Taenzer. Zeiss, Ocul. compens. 18. Tube raised 16mm. Obj. apochrom. 16mm.

- (a) Epithelium of the tunica of a vein, which contains dark yellow pigment in its protoplasm.



REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE NEW YORK  
ACADEMY OF MEDICINE.

BY DR. MARTIN COHEN, SECRETARY.

MEETING OF MARCH 17, 1913. DR. J. R. SHANNON, PRESIDENT, IN THE CHAIR.

Dr. JACKSON M. MILLS presented a case of **congenital melanosis of the cornea**. There was a vertical, spindle-shaped brownish deposit in the deeper layers of both corneæ, consisting of minute dots, dense at center and more isolated at margin. No evidence of previous inflammation. The symmetry and characteristic appearance justify the conclusion of its being a congenital melanosis of the cornea.

Its production has been explained by Krukenberg, Stock, and others, by assuming that at a certain period of development the pupillary membrane is in contact with the cornea and becomes absorbed, but the pigment remains and penetrates the cornea. This is borne out by cases with a persisting pupillary membrane connecting cornea and iris.

Dr. JOHN R. SHANNON asked whether the condition was bilateral, and also remarked that there was brown pigmentation of the cornea present as in Dr. Woodward's case presented at a previous meeting.

Dr. PERCY FRIDENBERG considered the condition due to uveal pigment, regardless of the color of the iris.

Dr. W. B. WEIDLER had observed a similar case in his practice.

Dr. MILLS next presented a case of **cataract produced by electric shock**, in a brakeman, aged 28. His head having come in contact with the overhead electric wire, while patient stood on the iron steps on top of his car, he received a shock of 11,000 volts. He was unconscious for seven hours and

spent  $2\frac{1}{2}$  months in the hospital. Loss of sight in left eye seven months after accident, also in right eye the month following, the only part affected being the lens. The center of the anterior capsules suffered most, being quite dense with a grayish-white, irregular opacity. Dotted opacities and striæ in the periphery. Left iris adherent to the capsule at temporal margin. As sight amounted only to counting fingers, Dr. Mills decided on discission and linear extraction, although the left lens was still immature one year after the accident. The operation was followed by glaucoma, but eventually resulted in  $V = \frac{20}{30}$ .

Dr. W. B. WEIDLER presented a case of **blepharochalasis** in a white girl, aged 14. Personal history negative. The upper lids became affected after severe sun-burn about three years ago.

The lids are slightly pinkish-red, hanging down in a pouch-like mass, the veins being rather prominent; on palpation the lachrymal glands are displaced downward and outward. The baggy, pouch-like mass of relaxed skin and subcutaneous tissue hangs down below the edge of the lid.

Wassermann, v. Pirquet, and urine negative.

This condition is different from ptosis adiposa, elephantiasis, or bilateral enlargement of lachrymal glands. It occurs most often in young girls, appearing usually at the age of 14, and is always limited to the upper lids.

Dr. PERCY FRIDENBERG remarked that these patients had a peculiar appearance which somewhat resembled ptosis adiposa.

Dr. WOOTTON had treated a similar case by removing an elliptical skin area.

Dr. THOMSON had observed a case of the same description following erysipelas which gave rise to lymphatic stasis. The treatment was surgical, but unsuccessful.

Dr. WEIDLER held that the atonic condition was due to a relaxation of the skin and subcellular tissue.

Dr. H. H. TYSON presented a case of **retraction of globe on attempted adduction** in a girl of 10 who had applied at the N. Y. Ophth. and Aural Inst. for glasses on account of weak vision. There was divergent strabismus of the left eye and enophthalmos of the right. On testing motility of the eyes

to the right, the right eye came forward and the palpebral fissure widened, while the left eye turned in with intermittent nystagmoid movements. In looking straight forward, the right eye tended slightly upward and was retracted with narrowing of the fissure, while the left eye tended to diverge with horizontal nystagmoid movements.

In looking to the left, the right eye retracted about 3mm, tending slightly upward, the fissure becoming narrower. The left eye turned well outward. On attempted convergence, the same movements occurred in the right eye, when it fixed with divergence of the left.

Citing Silex and Wolff as to the probable underlying pathological causes, Dr. Tyson said he agreed with Wolff as to the causes of the retraction and narrowing of the fissure, but as to the upward and downward turning of the eyes "being due to displacement of the orbital contents and the position of the optic nerve," he thought a better explanation might be found by considering the position and insertion of the fibrous band and opposing muscles and their lines of traction with varying amounts of innervation, as there are cases of paresis of externi and interni with a different level of the eyes, without causing any suspicion of changed position of orbital contents.

Dr. JOHN R. WHEELER called attention to the importance of the action of the oblique muscles in these cases which should not be overlooked.

Dr. PERCY FRIDENBERG asked whether any bilateral cases had been reported.

Dr. TYSON, in closing, answered in the affirmative, adding that there were also cases described in the literature in which the eyes looked downward, while in others they looked upward.

Dr. FRANCIS W. SHINE presented two cases of **vernal catarrh treated with radium**. In the first case, which had been shown five years previously, the right upper lid had remained smooth after treatment with radium by Dr. Abbe. The left upper lid had been treated over a period of three years once a month during the fall and winter, the exposures lasting from 10-15 minutes. The lid had become smooth but for a small tag of granulations at the inner extremity of the lid.

In the second case both lids had been treated by Dr. Abbe with about five exposures during the fall and winter of 1912 and 1913 and had greatly improved. Both cases were extreme types of the hard, flat, fibrous granulation.

Dr. JOHN R. WHEELER had observed the progress of this case and its excellent result.

Dr. SHINE next presented a case of **cyst of the vitreous**. Patient, female, about 28, complained of headache and was admitted to Dr. Lambert's clinic at the N. Y. Eye and Ear Infirmary. O. D., simple hyp. astigmatism; O. S., comp. myopic astigmatism.

Examination of fundus of O. D. showed a peculiar cyst of vitreous apparently about twice the size of disk which floated freely about on movements of eyeball, but on cessation of movements always returned to the same point just behind the ciliary body below or slightly to temporal side. The cyst was globular and of a steel gray color and semitransparent. It was probably congenital and composed of epithelial tissue, an outgrowth from ciliary body, which became detached, although the fact that it always returned to the same position suggested a small invisible filament still attached to the ciliary body.

After glasses were prescribed, the asthenopic symptoms disappeared. Patient had never noticed any symptoms due to presence of the cyst.

Dr. FRIDENBERG had seen a very similar case. The cyst was slightly pigmented, had slow motion, but no strand could be observed.

Dr. H. W. WOOTTON presented a specimen of **leucosarcoma of the choroid**. The patient, a woman of 72, stated the eye had been blind for two years and become extremely painful the week previous to examination. The day before admission to the Manhattan Eye and Throat Hospital there had been profuse hemorrhage from the eyeball. There was a rupture of the cornea, occupied by a blood clot. On enucleation the eye was found to contain a white tumor springing from the choroid and occupying the greater part of the vitreous. The tumor proved to be a round- and spindle-celled sarcoma with no pigment in the cells of the sections examined. Doubtless, some pigment existed in the tumor.



Dr. E. S. THOMSON stated that very little extension was seen outside the globe in intraocular tumors, they being recognized earlier at the present time. He had seen one recurrence after a perforation.

Dr. FRIDENBERG asked if this case was transilluminated; melanosarcoma was not transparent.

Dr. WOOTTON also presented the **Stephenson-Wolinski tonometer**. He did not believe Stephenson would claim the same accuracy for his instrument as that of the Schiötz tonometer, but it possessed some conveniences and had given a certain amount of satisfaction in trials at the Manhattan Eye, Ear, and Throat Hospital.

Dr. SCHOENBERG thought the principle on which this instrument worked was wrong, as it depended on springs instead of leverage, as the Schiötz tonometer. He also considered the plate too large and inquired whether both instruments had been applied on the same eye for control.

Dr. EDGAR S. THOMSON presented a case of extensive **wound across the limbus covered by a conjunctival flap**.

Dr. THOMSON next read a paper on **The value of the conjunctival flap in wounds of the cornea and sclera**.

All testimony on the use of the conjunctival flap to protect and aid in the healing of a corneal ulceration or wound is favorable. It has so many advantages and so very few disadvantages that it is difficult to understand why the practice should not be used invariably in a certain class of cases. Wounds of the cornea and sclera do not heal well and have a tendency to gape owing to absence of intraocular pressure, to traction of the extraocular muscles, to extrusion of some of the interior substances, and to flushing of aqueous. In order to combat the dangers arising from spontaneous closing of the wound, the conjunctiva offers the advantage of easily stretching, free blood supply, plentiful fibrinous exudate, all of which furthers healing and limits the inflammatory reaction.

The author proceeds to describe the various methods used and the forms of flaps, pointing out their advantages and disadvantages. The simplest form is the best, and the author dissects up a triangular flap, the apex of which lies close in between the wound and the corneal margin, loosening this flap so as to allow it to stretch readily and then attaching it to

the episcleral tissues on the other side of the wound or on the other side of the corneal margin, if necessary. The flap should not be used, unless it is reasonably certain that infection has not occurred.

Dr. Thomson has followed this method for the past 12 years in about 50 cases and feels sure that the results were better than if he had not used the flap. He has never seen pseudopterygium resulting from it.

There are a few special uses of the flap. In cataract extraction its advantages are numerous and well known. After iridectomy it has the advantage of guarding against prolapse of the iris or inclusions of the pillars.

Needling operations by puncture through the conjunctiva, just beyond the limbus, are more difficult to perform owing to the oblique position of the needle in relation to the membrane, but infection is less liable to occur than in puncture of the cornea.

In the use of the conjunctival flap for the repair of extensive corneal ulceration, the author has but little experience, but it is only advisable when the corneal tissue is not repairing satisfactorily. He has used a bridge of conjunctival tissue in such cases, dragging it across into position with guy sutures after Kuhnt's method. But the flap does not permanently adhere to the cornea and there is apt to be a certain amount of inflammation. Although the method seems to be a good one, the actual conditions rendering it advisable do not often arise.

As regards the general principle of using conjunctival flaps, the results are so very satisfactory that one is constantly tempted to use them more and more, after comparison with marginal wounds treated without flaps.

Dr. H. W. WOOTTON reported good results in fistulæ with the use of the conjunctival flap, while the result in ulcers was poor.

Dr. H. H. TYSON performs a conjunctival flap following cataract extraction.

Dr. DWYER mentioned a case of his, where the cornea and sclera were cut with presentation of the ciliary body which was not injured. He used three catgut sutures in the sclera after dissecting back the conjunctiva, and then sutured the conjunctiva. The result had been favorable.

Dr. SHANNON saw no objection to the procedure.

Dr. FRIDENBERG thought the technique might be improved by a subconjunctival injection, producing a large bleb which would aid in the dissection.

Dr. THOMSON, in closing the discussion, said the flap should be used in clean wounds. Statistics were of little value, there being so many factors to be considered. Granulations would occur in wounds, followed by secondary glaucoma. Some cases would heal spontaneously, but with the use of the flap the results were gratifying.

REPORT OF THE ANNUAL MEETING OF THE  
OPHTHALMOLOGICAL SOCIETY OF THE  
UNITED KINGDOM.

The first meetings of this Society under the revised Constitution were held on Thursday and Friday, April 24th and 25th, at the home of the Royal Society of Medicine and at the Royal London Ophthalmic Hospital, City Road, Mr. J. B. LAWFORD, President, occupying the chair.

Mr. FRANK JULER read a communication entitled **Acute purulent keratitis in exophthalmic goitre, treated** by repeated **tarsorrhaphy**. The case was discussed by the President, Mr. Juler, Senr. Mr. Coulter, Mr. Leslie Paton, Mr. Priestley Smith, Mr. Treacher Collins, Mr. Jessop, Mr. Bishop Harman, Mr. Inglis Pollock, Mr. Johnson Taylor; and Mr. Frank Juler replied.

Mr. ORMOND read a paper on two cases of **permanent hemianopia following migraine**, the patients being young and apparently healthy persons. He referred to three similar cases recorded by Dr. Thomas, of Boston. Mr. Ormond's first case was that of a woman, æt. 33, who had suffered from sick headaches all her life, and for ten years had been subject to very severe migraine. In September last she had a very severe attack, lasting three to four days, with very marked photophobia, but when she recovered she was unable to see anything on her right side. There were no other nerve symptoms, and she was otherwise healthy. The fundi were normal, and with some hypermetropic astigmatism corrected she had vision  $\frac{6}{6}$ . There was no defect of the pupil, nor of the extra-ocular muscles. The condition remained unaltered in February last, but she had not had such severe attacks since her loss



of sight. The second case was that of a woman, *æ*t. 32, who had had bilious headaches since 18 years of age. After three such attacks at intervals of a week, she woke up on August 4, 1912, with headache still present, and after running to catch a train she found her sight became misty, and when this cleared, she was unable to see anything on her left side; but, with her refraction corrected, she had quite good central vision. Nothing abnormal could be found in her general condition, but in March last the hemianopia remained, though during the interval she had given birth to a child. Spasm of the retinal arteries was considered to be a possible explanation. Observations had been made in patients temporarily blinded by attacks of migraine, in which a spasmodic condition of the retinal arteries had been seen with the ophthalmoscope. The probable cause of the blindness in these two cases was a spasm of that branch of the middle cerebral artery supplying the visual centre, resulting in a permanent interference with the visual function of that side, and so leading to blindness on the opposite side.

Dr. Gordon Holmes and Mr. Werner discussed the cases.

Dr. JAMES TAYLOR and Dr. GORDON HOLMES read papers on: (a) conditions present in several members of a family with **hereditary optic atrophy**; (b) unusual conditions associated with **optic atrophy, of the family type**. The first paper gave an account of two families showing a similar defect in vision. In the first family, *D*, the members of only one generation are affected. There are four brothers living, and two sisters; and of the four brothers, three are affected in a similar way, the fields showing the existence of a central scotoma for colors. The disks are pale. In the other members of the family there is nothing to suggest a similar defect. In the eldest of the three affected, the only other symptoms complained of are some weakness in the legs, and occasional difficulty in controlling the bladder. The reflexes are all normal. In the youngest brother, the visual symptoms are the only ones complained of. In the middle brother, besides the visual symptoms there are loss of knee-jerk, and a sluggish reaction of the pupil to light, pains in the legs, and analgesia of the lower limbs—signs and symptoms of *tabes dorsalis*. In this patient also, there is a definite history of syphilis. In the second

family, C, the affection of sight is similar, but it is spread over more than one generation. With pale optic disks in the members affected there is a central scotoma for white and for colors. In one member, optic neuritis was observed eight years ago. In one family, four members are similarly affected, while a fifth has congenital cataract. In a collateral branch, three cousins have suffered, and a sister of these cousins had a large family, one of whom suffers from the trouble. Another died of an orbital tumor. Two other cousins, the sons of another sister, suffered from defective sight, apparently the result of defective development. The points emphasized in the paper are: (1) The co-existence of family optic atrophy with tabes, yet the absence of any apparent effect of the tabes on the optic nerve in the cases affected. (2) The transmission of the optic atrophy in the female line, as shown by the family tree. (3) The occurrence of migraine in several of the patients affected, and its persistence even after practical blindness has been reached. (4) The occurrence of other eye defects in members of the family—congenital cataract in one, an orbital tumor in another, and defective eyes in two others.

At the Thursday afternoon session, Mr. ANGUS MACNAB read a paper on an **operation for the excision of the conjunctival sac and lid margins**. The conjunctiva and lids are cleansed with hydrar. perchlor. 1 in 2000. If there be any discharge from the lachrymal sac, the ordinary operation for its excision should precede the treatment of the conjunctival sac. The lids are scrubbed with ether soap, and the disinfection completed by means of benzine. The rapidity and ease with which the operation is performed will greatly depend on the absence of bleeding, and the manner in which the primary incisions are planned will have a considerable influence on the hemorrhage. A spatula is introduced into the sac, and the lids successively stretched over it as they are incised. He commences with the lower lid, entering the knife about 3mm from the lid-margin and opposite the junction of the inner  $\frac{1}{4}$  with the outer  $\frac{3}{4}$  of its extent, and, cutting freely down on to the tarsal plate, the incision is carried parallel to the lid margin to a point just beyond the external canthus; placing the spatula under the upper lid, a similar incision is made which will meet the former at the external tarsal ligament. These incisions

will pass down into the loose areolar tissue on the surface of the tarsal plates, and into the orbit above and below the external tarsal ligament. A pair of narrow sharp-pointed scissors is introduced with one blade above and the other below the external ligament, and the incisions are joined, some care being observed not to notch the skin at the angle at the same time.

The next step will depend on the condition of the conjunctiva. If it is thickened and glistening white, so as to be readily visible, the edges of the lids can be seized with a vulsellum forceps and drawn inwards and forwards towards the nose, while the conjunctiva is separated from the orbital tissues below with a blunt-pointed scissors, until the mass only remains attached at the inner  $\frac{1}{4}$  of the lids, which was not incised at the commencement of the operation.

If the conjunctiva be thin, redundant, folded, and hyperæmic, as is often the case, it would almost certainly be button-holed by such a procedure, and it is far better to introduce the left forefinger into the conjunctival sac and, thus stretching the membrane, separate it from the orbital tissues with the scissors. In these cases there will always be a rather free venous oozing, but as the dissection can be carried out by touch this can be neglected until the sac is thrown inwards, when a pad wrung out of hot water will usually leave the wound dry. The original incisions are now completed by means of a sharp-pointed scissors, one blade of which is passed under the skin, and the cuts made so that the lines of the first incisions are continued till they meet just beyond the internal canthus. The scissors are then rotated about a right angle, and the whole mass, consisting of lid-margins, conjunctiva, and tarsal plates, can be removed by a single cut. At this stage the angular vein will be divided and there will be a free hemorrhage, which can be easily controlled by forceps and ligatures. The wound is then closed by means of four sutures of fishing gut, which pick up the tissues at the bottom of the wound; the dressing is covered with a large pad of wool and a light-pressure bandage. Healing almost invariably occurs by first intention, and there is only a thin scar to mark the site of the operation.

The operation can also be performed when the remains of



a shrunken globe are present; in such cases the globe is pulled forward and dissected out with the conjunctiva.

In cases where the whole globe is present and the operation is being performed originally instead of the ordinary excision, the incisions are made in the same way as before recorded; the lower lid is then pulled up and the dissection of the tarsal plates and the conjunctiva from the orbital tissues continued up to the attachment of the conjunctiva to the globe, when the capsule of Tenon is opened; the upper lid is then treated similarly, and the excision continued by dividing the muscles and the optic nerve as in the usual manner. The completion of the operation is by separating the mass at its inner part in the manner already indicated.

The majority of my patients have been asylum patients, but I have used the same operation in the case of a malignant growth at the external canthus, which was invading the conjunctiva and the cornea, and in which there was no recurrence one year after the operation. One of my patients had trachoma in both of his empty sockets, which contained the remains of sunken globes; here the radical cure of the trachoma was achieved by the excision of both conjunctivæ.

I have been enormously impressed by the relief given to the patients who had discharging sockets, by this operation, and have no hesitation in recommending it to those persons who go about with an empty socket covered with a shade, especially as appearance too is greatly improved by the procedure here related.

Mr. N. BISHOP HARMAN read a paper entitled, **An analysis of three hundred cases of high myopia in children, with a scheme for the grading of fundus changes in myopia.**

These cases were collected during educational work in London, and all belonged to the elementary schools, so were socially of the working classes. All had come under observation in connection with the new schools for myopes; many had been watched for several years. Out of the 300, boys were 46%, girls 52%, a difference of 6%, which agreed with the difference in the sexes in ordinary vision tests. The bulk of the cases seen were aged 8 to 12 years. Cases in the earlier years were nearly all boys, which suggests a greater care by mothers for their men-children. The degree of myopia ranged from 4 to



25 D; the bulk—64%—were 6 to 12 D. The extreme degrees, were nearly all in girls. Hereditary influence was marked in 9%. Astigmatism, which the author considered a most likely exciting or adjuvant cause of myopia, was present in 64 %, a far higher proportion than in other defects. Previous keratitis was found in 11%. Congenital defects, such as albinism, coloboma uveæ, dislocated lenses, aniridia, existed in 5%; squint in 4%; nystagmus, mostly associated with bad vision, in 7%. The lens had been removed by operation in 3%, but the improvement of vision was not great.

Dealing with fundus conditions, Mr. Harman criticised adversely their present nomenclature for changes about the disk. He proposed that the fundus should be spoken of as first, second, or third degrees, according as the atrophy at the disk was as wide as one half the disk diameter, the whole diameter, or greater than that. To this would be added other details about the macula, etc. He showed a chart giving the correlation of refraction and fundus change; according to this plan, it bore out his contention. He maintained some definite notation was necessary when these cases came under observation for a definite object, such as the regulation of education.

Grave cases, with lens changes, vitreous opacities, or detached retina, numbered 8 cases, or less than 3%; of these, 3, or 1%, went blind, two of them probably by injury to their fragile eyes.

A chart was exhibited showing the changes in the myopia of 80 children who had received special education over several years; the number of stationary cases seemed to show these arrangements were of value in the control of the condition.

The next communication was by Mr. TREACHER COLLINS and Mr. HUDSON, on the **pathological examination of an eye with congenital anterior staphyloma.**

It was illustrated by a number of slides. Mr. TREACHER COLLINS followed with a paper dealing with **fibrous tissue formation** in connection with the **fibro-vascular sheath** and **visible vessels on the surface of the iris.**

The communication was discussed by Mr. Jessop, Professor Straub (Amsterdam), and Mr. G. Coats. Mr. Collins replied. Abstract of a paper by Mr. E. ARTHUR DORRELL, on the **sensory pupil reflex in tobacco amblyopia:**

The dilatation of the pupil obtained when the skin of any part of the body was stimulated was either in abeyance or obtained only by increased stimuli in tobacco amblyopia.

One hundred cases were examined by him. The lowest stimuli that gave dilatation in the normal eye were obtained from 5 to 7 cells of a constant-current battery, 5 cells of which gave approximately 3.5 milliampères, the negative electrode being applied to the side of the neck.

The cases were divided into three classes as follows:

Class A. Ordinary unselected cases, showing no signs of nervous disease and not suspected of tobacco poisoning.

Class B. Cases suspected of tobacco poisoning and showing no signs of nervous disease.

Class C. Cases showing signs of nervous disease.

In Class A, 58 eyes were examined, with the result that in 89 per cent only 5 to 7 cells were required to produce the reflex.

In Class B, 121 eyes were examined, and in only 20 per cent was dilatation obtained with 5 to 7 cells, and in over 50 per cent of the remaining 80 per cent no dilatation was obtained at all, with the strongest stimulus the patient could stand.

In Class C, 18 eyes were examined, and in only 22 per cent was the reflex obtained with 5 to 7 cells, and over 75 per cent of the remainder gave no dilatation.

Owing to the similarity in the results in Classes B and C, this test was not a positive sign in favor of tobacco poisoning alone, but should be included in the symptom-complex of locomotor ataxia and allied affections of the spinal cord.

Friday morning was occupied with the discussion of the subject, **vascular and other retinal changes in association with general disease.**

Dr. James Taylor opened the discussion by referring to the wide scope of the subject, and said he thought it would be impossible to discuss it fully in a manner which would be instructive. So he proposed to direct particular attention to thrombosis, or embolism of retinal vessels, and to raise some points in reference to other conditions embraced in the title of the discussion.

Dr. Taylor asked first as to the prognosis in albuminuric cases, and referred to the short duration of certain cases and the length of life in others. He mentioned a case of albuminuric retinitis which he observed during five years before death occurred. He referred also to diabetic cases and mentioned a case in which the condition had existed during eight years, the patient being still alive. The condition of "silver wire" arteries described by Marcus Gunn was also alluded to, and a case, seen by Gunn and diagnosed by him, was mentioned as being still alive after nine years. Dr. Taylor then referred to four cases with the ophthalmoscopic appearance of embolism of the central artery of the retina: In two of these, heart changes were present: in two, no such changes existed and there was no albuminuria. Reference was made to the frequent occurrence of the characteristic ophthalmoscopic appearance of embolism of the central artery in which no heart disease could be discovered. Such were probably thrombotic.

Eight cases of venous thrombosis were then described. In seven, albuminuria with an hypertrophied heart was present; in several, both conditions. One is alive and in fair health after two years.

A brief reference was made to retinal hemorrhage resulting from syphilitic disease—not a very common condition.

Dr. Taylor concluded by expressing the opinion, gained from the experience which his colleagues at Moorfields had afforded him, that in most cases of venous thrombosis cardiac hypertrophy and vascular disease are usually present. Albuminuria also may be present. In his experience venous thrombosis is not very common in glycosuric cases. The prognosis in such cases is bad, yet exceptionally the duration of life after venous thrombosis is much longer than one would naturally expect, and reference was made to a case seen by Mr. Morton six years ago, with venous thrombosis, who is still alive and well with good vision.

Mr. L. WERNER (Dublin) dealt with the subject **angiosclerosis** chiefly from the clinical and ophthalmoscopic points of view. The ophthalmoscopic evidences of the disease were first considered and discussed. The necessity of an ophthalmoscopic examination in cases of suspected angiosclerosis

in general practice was emphasized and some cases were related illustrating several points of interest.

Obstruction of the retinal circulation was next treated of in connection with two cases illustrative of different types of disease.

The first was one of embolism of the inferior temporal branch of the central artery, occurring in a gentleman aged about 48. The upper nasal quadrant of the field of vision was suddenly lost. A white plug was seen in the affected branch of the artery, which was almost empty below it. The central vision, however, was never impaired and was still normal fifteen months later. A few days after the attack, medical examination revealed the presence of a mitral valvular lesion.

Mr. Werner's second case was an unusual one of obstruction of retinal circulation in both eyes in a boy aged 11. The left eye became suddenly blind while he was at his lessons, and three days afterwards the sight of the right eye went in a similar way.

The ophthalmoscopic signs were those of blocking of the central artery with breaking up of the blood column in the vessels. In the second stage the left optic disk became swollen to such a degree as to resemble a choked disk and, in both eyes, white stars of exudation developed at the macula. Perception of light was absent in the right eye for twelve days and in the left for four, nevertheless vision improved to  $\frac{6}{36}$  in the former and to  $\frac{6}{24}$  in the latter.

The diagnosis was discovered and strong evidence brought forward to show that the disease in this case was tuberculous in origin.

In conclusion the interesting subject of sudden temporary obscurations of sight was referred to. The ophthalmoscopic appearances observed during the attacks were summed up, and the cause discussed, including the theory of arterial spasm.

Mr. GEORGE COATS described first the **normal structure of the central artery and vein**, and pointed out that in passing through the lamina cribrosa the elastic membrane of the artery breaks up into a feltwork of fine fibrils, while in the case of the vein elastic tissue disappears entirely from the wall. The normal central vein is little more than an endothelium-lined channel in the tissues.



Disease of the central artery takes the form of a deposition, on the inner aspect of the elastic membrane, of a new tissue composed in varying proportions of cells and fibrils, which encroach on the lumen, usually in an eccentric manner. The elastic membrane itself is often thickened, and elastic fibres are an important constituent of the new tissue. Both the cells and fibrils tend to undergo degeneration; the cells become swollen and fatty, the fibres indistinct and hyaline. Finally by breaking down, debris-filled cavities may be formed. These changes are always greatest in the outer layers of the new-formed tissue.

The primary lesion is probably a proliferation of the endothelium; in the normal central artery of a young person no other tissue is visible within the elastic membrane. The elastic tissue is probably a derivative of these proliferated cells, the case being analogous to the laying down of new layers of the membrane of Descemet by the endothelium of the anterior chamber.

Evidence of primary disease of the central vein is very rare even in cases of obstruction of that vessel. Thickening and infiltration of the wall occur, but not usually at the site of obstruction; they are therefore probably secondary, not primary and the cause of the block.

In the retinal vessels, the commonest form of disease, at least in cases of obstruction of the central vein, is a thickening of the fibrous tissue of the wall—fibrosis. This is the same condition as is found in the central vein, but it differs from the commonest type of disease in the central artery, the change affecting the intima in the central, the media in the retinal, arteries. Endothelial proliferation is also found, but more rarely.

It is not improbable that endothelial proliferation is a response to the stimulus of a circulating toxine; fibrosis, a strengthening of the vessel wall to resist increased blood pressure. Hence the frequency of fibrosis in the retinal vessels, which are badly supported and liable, when glaucoma is present, to be nipped at the edge of the cup.

It is probable also that endothelial proliferation is represented in the ophthalmoscopic picture by irregularities of calibre without much apparent change in the vessel wall,

while fibrosis, by increasing the reflection from the wall, causes brightening of the reflex (silver wire arteries), and in more advanced stages white lines along the vessels.

Mr. Coats also demonstrated the pathological features of some cases of obstruction of the central vein, and showed that in early stages a homogeneous thrombus might be found, which subsequently undergoes invasion and organization from the surrounding connective tissues, or sometimes from the endothelium. Probably the primary cause of most of these cases is interference with the circulation due to arteriosclerosis. Cases occur, however, in which there seems to be a true inflammatory affection of the vein wall, and this accounts for some of the instances in which young persons are attacked.

Two cases were also demonstrated which proved that not all cases of arterial obstruction are due to endarteritis and thrombosis, but that the condition may be due to embolism.

The discussion was continued by Mr. Priestley Smith, Professor Straub, Mr. Bishop Harman, Mr. Richardson Cross (Bristol), Dr. Leighton Davies, Dr. Gray Clegg (Manchester), Mr. Whitehead (Leeds), Dr. Gordon Holmes; and the openers replied.

In the afternoon an extensive series of cases was exhibited and discussed at the Royal London Ophthalmic Hospital. During the congress the members dined together.

## QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY

By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMEL, Erlangen;  
W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI,  
Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg;  
and M. WOLFRUM, Leipsic, with the Assistance of ALLING, New Haven;  
CALDERARO, Rome; CAUSÉ, Mainz; DANIS, Brussels; GILBERT,  
Munich; GRÖNHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUT-  
LER, Dresden; and VISSER, Amsterdam.

THIRD QUARTER, 1912—(Continued).

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

### IV.—METHODS OF RESEARCH, REMEDIES, INSTRUMENTS, AND GENERAL OPERATIVE TECHNIQUE. Reviewed by LOEHLEIN.

311. AUGSTEIN. A simple method of testing the pupillary reaction by means of two concave mirrors of different strengths. *Klin. Monatsbl. f. Augenheilkunde*, Sept., p. 366.

312. BEAUVIEUX. Tuberculin and ocular tuberculosis. *Arch. d'ophthalm.*, xxxii., p. 549.

313. V. BLASKOVICS, L. A new way of fixing the eyeballs of patients who cannot look downward. *Zeitsch. f. Augenheilk.*, xxviii., No. 2.

314. DARIER. Tuberculin in ocular therapeutics. *La clinique ophthalm.*, iv., p. 394.

315. VAN DOREN. The use of fibrolysin in ophthalmology. *Arch. med. belges*, August, 1912.

316. GRADLE, H. S. Tonometry, with a description of a tonometer. *Ophthalmic Record*, Sept., 1912.

317. V. LIEBERMANN, L. Recent experiences with tuberculin. *Zeitschrift f. Augenheilkunde*, xxviii., Nos. 2 and 3.

318. WOLFF, HUGO. Correction of anisometropia in aphakia by means of Zeiss's double system of lenses. *Ibid.*, Aug., Sept., p. 149.

AUGSTEIN (311, Method of testing the pupillary reaction) uses, to test the reaction of the pupil to light, the mirror of the ophthalmoscope and a reflector, such as is used by otologists. The ophthalmoscope, at the distance of 40cm from

the patient, serves to illuminate the pupil sufficiently to allow the behavior of the iris to be observed while stronger light can be thrown into each eye in turn with the reflector. In doubtful cases the iris can be watched with Zeiss's corneal microscope while the light is thrown into the eye with the reflector.

GRADLE (316, **Tonometry, with a description of a tonometer**) has devised an instrument which is an improvement over the Schiötz tonometer in the following particulars: The foot plate is 3mm smaller, thus enabling the operator to see the pupil and to accurately gauge the position; the radius of curvature is 7.6mm instead of 8.4mm, which more nearly approximates the corneal curve; the diameter of the stylet is smaller and brings the weight nearer to a mathematical point, and the weights are more readily applied.

ALLING.

WOLFF (318, **Correction of anisometropia in aphakia**) reports the case of a woman 20 years old who had had for 8 years monolateral aphakia in consequence of a traumatic cataract. The vision of the eye was  $\frac{5}{8}$  with +12 D. In spite of the high degree of anisometropia he was able to secure good stereoscopic vision with the aid of Zeiss's double system of lenses, which made the retinal image in the aphakic eye of the same size as that in the normal one.

V. LIEBERMANN (317, **Recent experiences with tuberculin**) prefers the bacillus emulsion in tuberculous diseases of the eye, and has used it with excellent results. He advises that the dose be increased very slowly so as to avoid raising the temperature above 37.5°, but considers elevations of temperature of a few tenths of a degree to be no contra-indication.

DARIER (**Tuberculin in ocular therapeutics**) considers tuberculin not to be a curative serum, properly speaking, for the tuberculous process, but a means whereby we can stimulate the power of resistance of the organism to the tuberculous infection. In the past 9 years he has treated 30 cases, 25 with positive, and 5 with negative results; these cases include various clinical forms of chorio-retinitis, iritis, scleritis, keratitis, and detachment of the retina. He thinks the best preparation of tuberculin is the bacillus emulsion. When this is not borne, even in the smallest doses, he uses endotin,



which is identical with tuberculin that is free from albumose, as this causes no rise of temperature. After a while, when the patient has become accustomed to this preparation, he tries the bacillus emulsion again. CAUSÉ.

BEAUVIEUX (312, **Tuberculin and ocular tuberculosis**) speaks particularly of the frequency of tuberculosis as the cause of simple disseminated chorioiditis and recommends, in all cases in which syphilis is excluded by a negative Wassermann and the suspicion is to some degree justified that tuberculosis is present, the careful administration of tuberculin. He gives the clinical histories of 6 cases that illustrate the benefit derived from this treatment. CAUSÉ.

VAN DOREN (315, **Use of fibrolysin in ophthalmology**) obtained a considerable improvement in a case of cicatricial adhesion of the upper lid, and in one of cicatricial entropion. He obtained no benefit in cases of leucoma, in fresh corneal infiltrates, and in parenchymatous keratitis. Opacities of the vitreous were influenced favorably, but the results in cases of old iritic exudates were negative.

In the exceptional cases, in which the patients to be operated on are unable to look downward, v. BLASKOVICS (313, **New way of fixing the eyeball**) recommends to incise the conjunctiva over the superior rectus and to pass a thread through the muscle, by means of which an assistant can control the position of the eye during the operation.

V.—ANATOMY, EMBRYOLOGY, MALFORMATIONS. Reviewed by PAGENSTECHER.

319. HIRSCH, C. **Encanthoschisis and other congenital anomalies of the eye.** *Klin. Monatsbl. f. Augenheilkunde*, July, 1912, p. 1.

320. VAN DER HOEVE, J. **Atypical coloboma of the lens.** *Nederl. Tijdschr. v. Geneesk.*, 1912, ii., No. 7.

321. PALMIERI, L. **Contribution to the study of congenital irideremia.** *Annali di Ottalm.*, fasc., 5-6-7, 1912.

322. POPOFF, E. **Contribution to the study of the plica semilunaris and of the lachrymal caruncle in man.** *Thèse de Paris*, 1912.

POPOFF (322, **Plica semilunaris and caruncle**) has studied the development of the plica semilunaris and the caruncle in sixteen human embryos measuring from 1.5 to 17cm long. He found the first signs of the development of the plica in an embryo 1.8cm long. The glands of the crescentic fold have

nothing to do with Harder's glands, but belong to those of Krause. The caruncle appeared first in an embryo 4cm long; its glands begin to develop when the embryo is 6cm long.

HIRSCH (319, **Encanthoschisis and other congenital anomalies**) describes two cases of malformation of the caruncle which he terms encanthoschisis. The caruncle is fissured, either in the form of a notch or of a reduplication. He thinks this malformation is due to amniotic adhesions which, under certain circumstances, may result in total absence of the caruncle.

VAN DER HOEVE (320, **Atypical coloboma of the lens**) reports a case of bilateral, nasal, large, saddle-shaped coloboma of the lens. The fibers of the zonula were absent in the middle, but were clearly to be seen at the two ends. Repeating the experiments of Wessely he performed iridec-tomies on new-born rabbits and determined the weight of the lens at different ages. The lens in the eye that had been operated on was always the lighter, and the difference was greatest when the operation had resulted in a coloboma. The coloboma of the lens caused by a defect in the zonule was probably a true coloboma and not a simple change in form. VISSER.

PALMIERI (321, **Congenital irideremia**) observed three typical cases of congenital absence of the iris in three members of the same family. The mother, 46 years old, had bilateral congenital irideremia, cataract, nystagmus, and glaucoma. Her right eye was amaurotic. Her 26-year-old daughter likewise had bilateral congenital irideremia, cataract with ectopia lentis, nystagmus, and glaucoma, on account of which the right eye was enucleated. A sister of the latter, 24 years old, had the same conditions of the eyes but the glaucoma in her case was without pain. CIRINCIONE.

#### VI.—NUTRITION AND INTRAOCULAR TENSION. Reviewed by WESSELY.

323. TOCZYSKI. The influence exerted by dionin upon the pupils and the tension of normal eyes. *Zeitschrift f. Augenheilkunde*, July.

TOCZYSKI (323, **Influence of dionin upon the pupils and the tension**) finds that an elevation of the intraocular tension takes place simultaneously with the onset of meiosis 10 or

20 minutes after the introduction of the dionin. The increase amounts to from 5 to 18mm of mercury, according to tonometric measurements, lasts about four hours, and then the tension returns to normal, or may become subnormal. The latter symptom does not seem to be absolutely associated with the mydriasis that follows the meiosis, as the mydriasis sets in usually at the time while the tension is still elevated.

VII.—THE SENSE OF SIGHT. Reviewed by KOELLNER.

324. BEHR. *Injuries of the eye by light.* *Arch. f. Ophth.*, lxxxii., p. 509.

325. EDRIDGE-GREEN. *New visual phenomena.* *Journal of Phys.*, August.

326. LOEHNER. *The visual acuity of man and its test. A physiologico-ophthalmological study.* 136 pages. Leipsic and Vienna. F. Deuticke.

327. MARX, E. *Studies concerning the differentiation of depth by the macula and by extra-macular portions of the retina.* *Nederl. Tijdschr. v. Geneesk.*, 1912, ii., No. 7.

328. PICHLER. *The visual field in scintillating scotoma.* *Prager med. Wochenschrift*, 1912.

329. PORTER and EDRIDGE-GREEN. *Negative after-images and successive contrast with pure spectral colors.* *Proceedings of the Royal Society*, B, vol. 85, p. 434.

PORTER and EDRIDGE-GREEN (329, *Negative after-images and successive contrast with pure spectral colors*) wearied the eye with approximately pure homogeneous light of great intensity and then directed it at a spectrum cast upon a screen in a dark room. The negative after-image of the first illumination was then visible over the spectrum as a narrow dark band of the complementary color. The persistence of the after-image was noteworthy; it did not change its color and was not influenced by the variously colored spectral light that now fell at the same time on the retina, unless this was of too great intensity.

EDRIDGE-GREEN (325, *New visual phenomena*) endeavors to support his theory of the perception of color by a number of after-image symptoms which cannot be quoted here in detail. Among other things he has noticed that an after-image loses its form and is distributed over the retina when the patient shakes his head. After looking at a mosaic of red and blue squares the after-images of the red disappear more quickly than those of the blue. Colors also disappear

more quickly in the after-image than the sensation of light and dark. His observations indicate, he thinks, that the photochemic means of stimulation must be situated outside of the elements that respond to the stimulation. This means of stimulation is given in the fluid about the cones, which must excite the sensation of all colors. It is quite probable that the pigment cells take part in the formation of the photochemic agent. He is not aware of any fact that indicates that the rods are percipient elements; on the contrary, he believes that the ends of the cones are excited by the photochemic disintegration of the surrounding fluid. The rods serve only as reservoirs for the visual purple, which plays a part in the sensitizing fluid. In regard to the question whether a Purkinje's phenomenon exists in the fovea or not he says that it depends on the intensity of the light used in the examination; with reduced light it may be demonstrable.

PICHLER (328, **Visual field in scintillating scotoma**) made a number of observations on himself and collated fifty cases. The defect in the visual field was exactly symmetrical in both of his eyes and clung close to the median line. Hemianopic scotomata are, in his opinion, negative. He saw in the relative scotoma peculiar disturbances of the color sense, such as are apt to occur in interruptions of the conductivity of the optic tract; red colors appeared to be yellow, yellow to be pale. As prodromal symptoms transient colored spots were sometimes observed which did not move about in the visual field; the typical attack came on some time after they had disappeared. Whether true disturbances of adaptation occur, remains uncertain. The hemianopic scotoma is not always of the same extent as the scintillating area; in his own case the latter was not as large as the defect in the visual field.

MARX (327, **Differentiation of depth by the macula and by extra-macular portions of the retina**) thinks that sufficient attention has not been paid to the question of the difference between the differentiation of depth by the macula and by other portions of the retina. He experimented with three threads; the middle one was movable in the median, the others in a frontal direction. With the outer threads at varying distances from each other he could tell at a glance whether the middle



thread was in front of or behind the plane of the former. Within the limits of the macula he found no difference, but outside the macula, beginning with an excentricity of  $1.5^{\circ}$  to  $2^{\circ}$ , the necessary displacements of the middle thread as the distance between the others increased quickly became greater, and the accuracy of the perception of depth less, approximately in harmony with the excentric diminution of the monocular visual acuity. VISSER.

LOEHNER (326, **Visual acuity**) points out that various things are understood by the term visual acuity, and groups all of its definitions under three headings: (1) the visual acuity is identical with visual capacity in its widest sense; (2) visual acuity corresponds to the perceptive ability of the retina; (3) visual acuity is the product of many factors, including in addition to the latter the dioptric apparatus of the eye and the mechanism of transmission to the central nervous organs. We have first to distinguish, according to Hering, between the *minimum visibile*, the ability to recognize very minute differences in position and size, and the *minimum separabile*, the power to perceive as separate two points or lines, and then we have to add the optic sense of form, the power to distinguish peculiarities or deviations of form (Guillery). At the same time it may happen that persons may have a fine sense of form in whom the visual acuity is impaired. The *minimum separabile* is relatively the easiest to determine. The author then considers the dioptric components of visual acuity, the influence of diffuse and lost light, and that of the size of the pupil, as well as the retinal and post-retinal components, the light and color sense, and the effect produced by prolonged observation. Finally he takes the stand that visual acuity is always the expression of the total of the factors mentioned, including attention, practice, and intelligence, and should not be used as synonyms with the fineness of the *minimum visibile* alone. Hence a number of tests should be employed to determine the visual acuity in various ways.

BEHR (324, **Injuries of the eye by light**) has been able to demonstrate a chronic injury of the eye by artificial light. He observed in four cases a considerable impairment of the adaptation to dark without any objective trouble. The patients complained of scintillations and bad vision on going from the

dark into the light. They had no hemeralopic troubles in spite of the demonstrable disturbance of adaptation. Under the influence of normal illumination the disturbance passed away completely without treatment. Behr names this trouble *ophthalmia electrica chronica*. He finds that there is always a considerable disturbance of the adaptation to dark in aphakic eyes and concludes that it is caused by the intensive action of the short waved rays.

VIII.—ACCOMMODATION AND REFRACTION. Reviewed by  
KOELLNER.

330. BETTREMIEUX. Why the statistics relative to the refraction of school children are so little in harmony. *Ann. d'ocul.*, cxlviii., p. 192.

331. DOMEQ. Pressure massage and meiotics in myopia. *La clinique ophtalm.*, iv., p. 474.

332. HOROWITZ. The influence of cocaine and homatropine upon the accommodation and the size of the pupil. *Inaug. Diss.*, Berlin.

333. ISAKOWITZ. Compensation of a mixed astigmatism by the pressure of the finger. *Meeting of the Berlin Ophthalm. Society*, July 17.

334. VOIROL. Investigation of the refraction, vision, color sense, and muscle balance in the eyes of 939 school children. *Zeitschrift f. Augenheilkunde*, xxviii., p. 95.

335. WILSON. Keratitis as a cause of myopia. *The Ophthalmoscope*, July.

VOIROL (334, Refraction, vision, color sense, and muscle balance in school children) examined 939 children and found that the normal refractive condition of infants, hypermetropia, persists in the early years of school life in more than a third of the children, but later changes to emmetropia and myopia. Corneal astigmatism of over 1.25 D. was present in 15%; astigmatism over this amount, due to cornea, lens, and vitreous, in 13%. The number of cases of astigmatism was greater in the younger than in the older children, whence he concludes that astigmatism tends to gradually adjust itself. Only 14% of the children had vision of less than 1; this was due in one half to astigmatism. The greatest percentage of good vision was among the emmetropes, it was rather less among the hypermetropes, and least among those who were astigmatic. The pupillary distance increases with the age of the child, and is greater in myopia. The refraction was determined with the skiascope, the corneal astigmatism with the ophthalmometer. The most common form of muscular imbalance

was insufficiency of the internal rectus, which was present in 14% of the children. This was more frequent in children who had large pupillary distances than in those in whom the pupillary distance was short. Marked red-green blindness he found in 1.3%, ten times as often in boys as in girls.

BETREMIEUX (330, **Statistics relative to the refraction of school children**) refers the lack of harmony in the statistics concerning the refraction of school children to the difference in the methods of investigation employed, and also to the method of classification of anisometropes. If in the latter one eye is astigmatic it should be noted as an error of refraction, irrespective of the higher hypermetropia or myopia, because the correction of this is of very great prophylactic importance. Out of 7900 children in the primary schools, 54% of the girls and 46% of the boys had vision less than 1; 35% had astigmatism, 30% hypermetropia, 12% myopia. Bettremieux is for full correction in myopia.

CAUSÉ.

A boy 16 years old had 6 D of mixed astigmatism, according to ISAKOWITZ (333, **Compensation of mixed astigmatism by the pressure of the finger**), which could be compensated by the pressure of the finger. The refraction was + 3 D.—6 D. cyl. axis 180°. When the eye was pressed by the finger the vision improved from  $\frac{6}{80}$  to nearly  $\frac{6}{8}$ .

WILSON (335, **Keratitis as a cause of myopia**) found myopia in 70% of 100 cases of corneal opacities and therefore recommends that children with phlyctenular and parenchymatous keratitis be kept under observation as long as possible, and that atropine be used carefully.

GILBERT.

DOMEC (331, **Pressure massage and meiotics in myopia**) believes pressure massage used in combination with meiotics and the wearing of fully correcting glasses to be a means capable of arresting the development of myopia. Pressure massage also works well upon myopic changes in the chorioid, and promotes the absorption of opacities in the vitreous. The explanation of its effect that he gives is that the aqueous is driven into the sinus by the slow pressure, dilates the natural passages so that a larger quantity of intraocular fluid is excreted each time than usual. During this treatment,

which is kept up a long time, the zonule becomes more elastic and the ciliary muscle stronger. He also supposes that it has a third effect upon the surface of the retina and chorioid.

#### CAUSE.

HOROWITZ (332, **Influence of cocaine and homatropine upon the accommodation and the pupil**) has studied carefully the paresis of accommodation and the dilatation of the pupil produced by cocaine and homatropine upon twenty-six persons of different ages. The average results are: with cocaine the paresis of the accommodation begins at the end of 5 or 10 minutes, increases rapidly, reaches its maximum in about half an hour, remains at its acme for 10 or 15 minutes, and then decreases pretty steadily to zero in from an hour and a half to two hours. The paresis is very slight at its maximum with small doses, but may be made total with large ones. The mydriasis reaches its maximum later than the paresis of the accommodation, and the return to normal usually takes 4 or 5 hours. With homatropine the paresis of the accommodation is demonstrable after 10 or 15 minutes and reaches its acme in from  $1\frac{1}{4}$  to  $1\frac{3}{4}$  hours. It remains at its maximum about  $1\frac{1}{2}$  hours, and then gradually retrogresses until the normal range of accommodation is reached in about 15 hours. The paresis is considerable even with a small dose; with a larger dose the entire accommodation may be paralyzed. The dilatation of the pupil outlasts the paresis of the accommodation by some hours.

#### IX.—THE MOTOR APPARATUS OF THE EYES. Reviewed by KOELLNER.

336. CONZEN and SCHWARZ. A case of multiple sclerosis with a peculiar disturbance of the ocular muscles. *Med. Klinik*, No. 35, p. 1444.

337. DEUTSCHMANN. Ophthalmoplegia interna in childhood. *Beitraege zur Augenheilkunde*, June, 1912, p. 19.

338. HEIMANN. Strabismus and its treatment in children. *Archiv f. Kinderheilkunde*, vol. lviil., p. 72.

339. KORT. Hysterical spasm of the muscles of the eyeball. *Inaug. Diss.*, Rostock.

340. KUMAGAI. A case of paresis of the trochlearis in the course of typhoid fever. *Zentralbl. f. Augenheilkunde*, vol. xxxvi., p. 262.

341. OHM. Miners' nystagmus. *Klin. Monatsbl. f. Augenh.*, July, p. 102.

342. SALUS. Paresis of the oculomotorius with abnormal cyclic innervation of its inner branches. *Ibid.*, p. 66.



343. TACKE. Congenital absence of the inferior rectus. *Société belge d'ophthalm.*

344. WICHODZEW. The influence of inclination of the head toward the shoulder upon the movements of the eyes. *Zeitschrift f. Sinnesphys.*, vol. xlvii., p. 394.

WICHODZEW'S (344, Influence of inclination of the head toward the shoulder upon the movements of the eyes) studies took into account the monocular and binocular field of fixation, the divergence, the convergence, the positive and negative vertical divergence, and the symmetric rotation of the eyes about a sagittal axis. These studies have a certain practical interest because many persons have to work lying down, or with the head inclined to one side. He finds that the inclination of the head toward the shoulder produces a uniform diminution of the binocular field of fixation, tested with the perimeter, which grows smaller as the inclination of the head is increased. The cause of this is supposed to be the compensatory rotation of the eyes about a sagittal axis, which changes the relations between the fixation point and the ocular muscles and so restricts the movements of the latter. The monocular field of fixation remains unaffected. The power of convergence decreases as the inclination of the head increases, apparently because of the reflex rolling. The horizontal divergence becomes smaller for the same reason. The positive vertical divergence, *i.e.*, the power to invert the right optic axis over the left, increases with the inclination of the head toward the left shoulder; the negative vertical divergence, *i.e.*, the power to place the right optic axis below the left, increases with the inclination of the head toward the right shoulder. To explain this it must be supposed that the retinal images assume another place, in consequence of the compensatory rotation of the eyes, than that which they occupy when the eyes are vertical. Apparently the ability of the eyes to perform this symmetric rotation about a sagittal axis increases somewhat with the inclination of the head.

OHM (341, Miners' nystagmus) finds that this nystagmus is due to a central disturbance of innervation which is usually binocular. There is alternation between vertical and horizontal nystagmus regularly. The seat of the disturbance is thought to be the nucleus of the oculomotorious and troch-

learis; its nature to be a weariness shown by a lessened frequency of stimulation. The cause of the weariness is the constant looking upward demanded by the nature of the work, but the illumination plays an important part. The weariness does not affect the entire nuclear region, but only the parts that govern these particular movements of the eyes. It is more difficult to look upward, physiologically, than to look in other directions, because of a certain muscular insufficiency. For certain forms of miners' nystagmus he suggests that an advancement of the interni may be performed, but he has done so in only two cases.

HUMMELSHEIM.

HEIMANN (338, **Strabismus and its treatment in children**) believes that the cause of strabismus is the partial or total absence of the power of fusion and therefore advocates conservative treatment. A strabismic child should be atropinized as early as possible, and the total hypermetropia completely and permanently corrected. In certain cases it is well to continue the atropine in one eye. When the child is old enough for systematic exercises, at the end of its third or fourth year (?), exercises with the amblyoscope should be instituted several times a week. An operation is indicated when all conservative methods have failed, or when they are hopeless from the start because of a large angle of strabismus, over  $15^\circ$ , or of a high degree of amblyopia of one eye. In such cases it may be performed at the end of the fourth or fifth year. Less is to be hoped from conservative treatment in divergent strabismus. The preferable operation here is advancement of the internus, perhaps with tenotomy of the externus. The latter alone is useless.

SALUS (342, **Paresis of the oculomotorius with abnormal cyclic innervation of its inner branches**) observed an interesting case of this nature in a man 20 years of age. When at rest there was a simple paresis of the oculomotorius, but if the patient was watched carefully the upper lid was seen to rise suddenly with irregular twitchings; at the same time the pupil, which was originally dilated, contracted with fluctuations until it was finally smaller than the other. Coincidentally with these movements the refraction of the eye was increased, as shown by the skiascope. The contraction

of the pupil lasted from 10 to 30 seconds. The suggestion Salus makes in explanation of this phenomenon is that there was at an early period of life, or congenitally, an interruption of the conductivity of the nerve trunk close to its exit from the pedunculus cerebri, and that then there was a regeneration of fibers of such a nature that those appertaining to the extrinsic muscles united with those that supplied the internal muscles of the eye, so that the innervations which would otherwise go to the extrinsic muscles alone reach the pupil and the ciliary muscle.

A boy 7 years old suffered from nystagmus and strabismus. TACKE (343, **Congenital absence of the inferior rectus**) diagnosed a paresis of the left inferior rectus and attempted to advance it, but could find no muscle. Correction was secured by tenotomy of the right and left superior recti and advancement of Tenon's capsule.

DEUTSCHMANN (337, **Ophthalmoplegia interna in childhood**) increases the number of reported cases of this condition to fourteen. In all but one a parenchymatous keratitis due to hereditary syphilis was present, and Wassermann's reaction was positive in that one also. As no atrophy of the iris was visible and the sphincter responded promptly to eserine, although cocaine did not dilate the pupil, he thinks the cause was a lesion in the nucleus caused by hereditary syphilis. He propounds the following explanation of its connection with the corneal inflammation: the nuclear affection existed already, but had not yet affected the pupils; the dilatation of these with atropine gave the impulse to render the disturbance manifest.

KUMAGAI (340, **Paresis of the trochlearis in typhoid fever**) reports the second case of this nature on record. The patient, 28 years old, developed diplopia at the end of the third week of the disease. A connection with the typhoid fever was assumed because of the absence of any other cause to explain the paresis. Kumagai thinks the condition was one of toxic peripheral neuritis and not due to any central changes because this was a mild case of fever without any cranial symptoms.

KORT (339, **Hysterical spasm of the ocular muscles**) reports two cases of hysterical spasm of convergence following an injury in each case. The first patient was a girl 19 years old.

When she fixed on a near object, wide horizontal movements of the eyeballs set in, and they finally assumed a position of extreme convergence. All near work was rendered impossible. No other hysterical symptoms on the part of the eyes could be demonstrated. The second patient was a neurasthenic 41 years old. The eyes assumed a position of extreme convergence with annoying diplopia in looking at near objects, which was obviated by closing them. Nothing is said as to the results of treatment in these cases.

In the case reported by CONZEN and SCHWARZ (336, **Multiple sclerosis with a peculiar disturbance of the ocular muscles**) the movements of the eyes to the right and left were slow, as though they were hindered by an obstruction. In diagonal movements the eyes first made the necessary vertical excursion up or down and then moved horizontally toward the object of fixation. Movements up and down were performed with normal celerity. Convergence was little retarded, while the adjustment of the eyes for distance was greatly delayed. There was in addition a bilateral paresis of abduction. As multiple sclerosis was present the author thinks that there was a lesion in the pons, not far from the nucleus of the abducens.

X.—LIDS. Reviewed by KRAUSS.

345. V. BLASKOVICZ. **Rotation of the cartilage of the lid; a new operation for cicatricial entropion.** *Zeitschr. f. Augenheilk.*, xxviii., 2 and 3, p. 286.

346. CHAILLOUX. **Lupus erythematoses of the lid and its treatment with carbonic acid snow.** *Klin. Monatsbl. f. Augenheilk.*, Sept., p. 376.

347. CLAPP, C. A. **A case of gumma of the eyelid.** *Ophthalmic Record*, June.

348. KRAUSS, W. **Ganglioneuroma; a tumor not hitherto observed on the eyelid.** *Zeitschrift f. Augenheilkunde*, August–September, p. 110.

349. ROESSLER, F. **Elephantiasic swelling of the lid after suppuration of the neighboring lymphatic glands.** *Klin. Monatsbl. f. Augenheilk*, September, p. 325.

ROESSLER (349, **Elephantiasic swelling of the lid after suppuration of the neighboring lymphatic glands**) reports a case of this nature met with in a man 18 years old. At first there was a little affection of the skin, through which entered an infection that resulted in the purulent breaking down of the lymphatic glands in front of the ear and along



the lower jaw. This gave rise to an obstruction of the normal flow of lymph, œdema, and finally to a pachydermia lymphangiectatica, as shown by the histological examination of a piece excised from the swollen upper lid. It is also possible that this engorgement of lymph was due to an engorgement in the veins of the face caused by the cicatricial contraction of the skin.

CHAILLOUS (346, **Lupus erythematodes of the lid**) had a patient 32 years old who complained of twitchings of the lids and photophobia. She had previously been treated for lupus of the cheek. The lids were reddened, thickened, and there was a considerable exfoliation of epidermis from the tarsal portion of the lower ones. This he reported as a rare case of lupus erythematodes of the lids, which was materially improved by treatment with carbonic acid snow.

CLAPP'S (347, **Gumma of the eyelid**) patient presented a painful, indurated mass near the inner angle of the upper lid, over which the skin was freely movable. The conjunctiva was thickened over the tumor, which measured 6mm by 3mm. Incision and curettage brought away only broken-down cellular tissue. Later there appeared an ulcer at the limbus underlying the tumor of the lid. This gradually involved the cornea. As Wassermann's reaction was positive, and as the patient responded immediately to antisiphilic treatment, he believes the lesion of the lid to have been a gumma or a chancre. The situation and absence of glandular involvement would exclude the latter.

ALLING.

KRAUSS (348, **Ganglioneuroma**) excised from the lower lid of a 15-year-old boy a little tumor which proved on histological examination to be a ganglioneuroma. It consisted chiefly of bundles of non-medullated nerve fibers, between which medullated nerve fibers and ganglion cells were to be found. The latter varied greatly in form and size, had capsules and processes, usually contained several nuclei, and exhibited peculiar changes in the protoplasm. The case was considered to be one of true ganglioneuroma, which has never before been found in the lid, starting perhaps from the sympathetic.

v. BLASKOVICZ (345, **Rotation of the cartilage of the lid**) recommends instead of Kuhnt's enucleation of the tarsus

for cicatricial entropion, which presents some disadvantages, a rotation, or inversion, of the tarsus. He has tested the operation in 17 cases and obtained good results. The first part of the operation is performed in the same manner as the enucleation of the tarsus, but before cutting the muscular fibers inserted into its convex margin he introduces sutures into the cut edge of the conjunctiva. Then the muscular fibers are cut at each end of the tarsus, leaving a bundle 3 or 4mm broad in the middle. Then the tarsus is rotated until its concave posterior surface is directed forward and returned to its place, where it is secured by means of the sutures.

XI.—LACHRYMAL ORGANS. Reviewed by KRAUSS.

350. BRYAN, W. M. C. Submucous dacryocystorhinostomy for persistent dacryocystitis. *Annals of Ophthalmology*, July, 1912.

351. LUEDDE, W. H. Congenital absence of both lower puncta. Life-long (double) dacryocystitis. Apparent cure from dacryocystorhinostomy. *Ibid.*, July, 1912.

352. RHESE. Rhinogenous involvement of the lachrymal passages, especially the connection of chronic dacryocystitis with diseases of the ethmoid and its treatment. *Deutsche med. Wochenschr.*, No. 35, p. 1646.

353. TRAPESONZEWA, E. A case of unpigmented nævus in the region of the punctum lacrimale. *Westn. Ophthalm.*, August, 1912.

TRAPESONZEWA (353, Unpigmented nævus in the region of the punctum lacrimale) found a tumor between 2 and 3mm in diameter surrounding the lachrymal punctum of a patient 60 years old. It had appeared within the last four or five months. The microscopic examination revealed accumulations of cells which resembled endothelium, but were in no way associated with it. The cells had large nuclei, contained little protoplasm, stained well, and showed no pathologic changes aside from a rare vacuolization. The heaps of cells were enclosed in a membrane which appeared to be sprinkled with single endothelial cells. These heaps extended like rays from the periphery to the lachrymal canal. No pigment could be discovered in any cell. Otherwise the case resembled the one described by Foerster and may be classified as a lymph-endothelioma.

v. POPPEN.

Congenital absence of the puncta may be associated with other embryonic disturbances involving the orbit, but LUEDDE (351, Congenital absence of both lower puncta)

has found records of only three cases besides his own in which there were no other abnormalities present. An artificial opening made into the sac did not remain patent. In the total four cases three showed involvement of the lower puncta and only one in which the upper was involved as well.

ALLING.

RHESE (352, **Rhinogenous involvement of the lachrymal passages**) thinks that disease of the ethmoid is much more responsible for chronic dacryocystitis than diseases of the lower nasal passages. He maintains: (1) that chronic dacryocystitis is caused very frequently by disease of the ethmoid, and therefore that the anterior ethmoidal cells have the same relative importance to the lachrymal sac that the posterior accessory sinuses of the nose have to the contents of the orbit; (2) that the prognosis of a chronic dacryocystitis caused by disease of the ethmoid is excellent, as operation on the ethmoid is accustomed to cure even obstinate cases with fistulæ; (3) that even in cases of disease of the lachrymal passages caused by other conditions in the nose the middle meatus is of greater pathogenetic importance than the lower; (4) that skiagraphs, taken with a probe introduced into the lachrymo-nasal canal, are strongly to be recommended for the determination of the rhinogenous causes underlying the disease of the lachrymal passages.

BRYAN (350, **Submucous dacryocystorhinostomy for persistent dacryocystitis**) made a vertical incision in the mucous membrane and elevated it from the bone just in front of the anterior end of the inferior turbinate as far upward as the level of the lachrymal sac. The median bony wall of the sac was then removed by the curette. After making a hole in the flap of mucous membrane corresponding to the opening in the bone and sac, it was replaced and packing applied. The result was immediate relief from the purulent discharge, which had existed in this case since childhood and had resisted all other treatment. This operation had been suggested previously by others.

ALLING.

XII.—ORBITS, EXOPHTHALMOS, ACCESSORY SINUSES. Reviewed by KRAUSS.

354. ALLPORT, F. **Removal of a spindle-cell sarcoma from the right orbit. Recovery with intact ocular apparatus.** *Ophthalm. Record*, July.

355. BEDELL, A. J. Another case of chloroma. *Annals of Ophthalm.*, July, 1912.

356. DUFAU. Motor ocular troubles in sinusitis. *La clinique ophtalm.*, vol. iv., p. 341 and 421.

357. HANSELL, H. F. A case of œdema of the orbits, secondary to facial dermatitis. *New York Med. Journal*, August 3.

358. HOLDSWORTH, F. Orbital cellulitis with report of a case. *Ophthalmic Record*, June, 1912.

359. JACQUEAU. Acute meningitis after enucleation of the eye for post-traumatic phlegmon. *Annales d'oculistique*, cxlviii., p. 195.

360. KLEYN, A. DE, and NIEUWENHUYSE, P. The dangers of latent inflammations of the accessory sinuses. *Nederl. Tijdschr. v. Geneesk.*, No. 7.

361. LEPLAT. Unilateral external ophthalmoplegia with exophthalmos and tachycardia. *La clinique ophtalm.*, vol. iv., p. 466.

362. RUEBEL, E. Enlargement of the blind spot (van der Hoeve's symptom) and central scotoma in disease of the posterior accessory sinuses of the nose. *Klin. Monatsbl. f. Augenheilkunde*, August, p. 130.

LEPLAT (361, Unilateral external ophthalmoplegia with exophthalmos and tachycardia) met with a condition of this nature in a woman 24 years old. Although other signs of exophthalmic goitre were absent, it was probably a case of this disease. Large doses of potassic iodide were given, the pareses of the ocular muscles and the exophthalmos retrogressed within two months, and the tachycardia completely disappeared. Wassermann's reaction was negative. From the behavior of the parietic sphincter pupillæ of the right eye, which showed a distinct reaction when the eye was turned to the left, but not when turned to the right, hence with the synergic activity of the internus which is likewise supplied by the oculomotorius, Leplat concludes that the parietic fibers may carry the impulse from the nuclear region of the internal rectus and perhaps also of the ciliary muscle.

CAUSÉ.

DE KLEYN and NIEUWENHUYZE (360, Dangers of latent inflammation of the accessory sinuses) give the clinical history of a man who had a fracture of the skull, the fissure passing through the frontal bone, the roof of the left orbit, the left sphenoidal sinus, the sella turcica, and the clivus. The patient had enophthalmos of the left eye. The right field of vision was island-like, the vision  $\frac{4}{8}$ ; that of the left was reduced to a minute trace in the nasal periphery, vision  $\frac{1}{300}$ .



One month after the accident the patient died of purulent meningitis caused by an empyema of the sphenoidal sinus. At the autopsy the chiasm was found to be torn completely into two portions. The medial portion of the roof of the left orbit was displaced downward, the outer portion upward.

VISSER.

JACQUEAU (359, **Acute meningitis after enucleation**) saw a very acute meningitis with cellulitis of the orbit after enucleation of the eye because of a wound with a piece of iron. The enucleation was performed without delay on the day after the cellulitis of the orbit began; the next day meningitis set in and rapidly proved fatal. In spite of this case Jacqueau believes enucleation to be the best operation in commencing panophthalmitis, because recovery is more rapid than after any other procedure, and because it affords the patient greater security for the future. But if signs of commencing cellulitis are present, or if a florid panophthalmitis already exists, the operation of choice is exenteration with the cautery.

CAUSÉ.

ALLPORT (354, **Removal of a spindle-cell sarcoma from the right orbit**) removed three small encapsulated tumors from the upper nasal wall of the orbit through an incision similar to the Killian frontal sinus operation. There was perfect recovery from the exophthalmos, divergence, and normal vision.

ALLING.

BEDELL (355, **Another case of chloroma**) reports on a case already published which showed four tumors of the orbit and lids with proptosis, optic neuritis, and ophthalmoplegia. He also records another case—a female aged 18, in whom examination disclosed nodules attached to muscles and bones in the breasts. The blood count showed reds 2,200,000, whites 52,000. The right eye bulged 25mm with intense engorgement of the veins of the lid and temporal region. A tumor mass was present in the lid and extended deeply into the orbit. The cornea was completely unprotected and the conjunctiva chemotic. An autopsy was obtained and a complete pathological report is given.

ALLING.

Enlargements of the blind spot, van der Hoeve's symptom, and central scotomata play a very important part in th

diagnosis of diseases of the posterior accessory sinuses of the nose, while the behavior of the peripheral portion of the visual field furnishes no material aid in such cases. This is confirmed by four clinical observations made by RUEBEL (362, **Diseases of the posterior accessory sinuses of the nose**). His first case was one of bilateral empyema of the ethmoid cells, with a great enlargement of the blind spot for red and green of both eyes. A week after the opening of the left posterior ethmoid cells these symptoms had disappeared from both eyes, whence he concludes that each ethmoid is in connection with both optic canals. In the other three cases there was also a more or less marked central scotoma, or enlargement of Mariotte's spot, associated in the second case with a paresis of the accommodation. In this case all of the symptoms passed off after resection of the hypertrophic middle turbinate, which he regards as the cause of the optic nerve trouble. Quite trivial changes in the mucous membrane of the accessory sinuses may give rise to these symptoms, as is shown by the third case, in which they disappeared within two or three weeks after the opening of apparently normal ethmoid cells. In the fourth case there was a large, absolute, central scotoma that extended over the blind spot, which was itself considerably enlarged. This disappeared almost completely after the operative treatment of the basal disease. The outer margins of the visual fields remained normal in spite of the long continuance of the disease of the optic nerve.

DUFAU (356, **Motor ocular troubles in sinusitis**)<sup>\*</sup> says that the development of the clinical picture is apt to vary a great deal. Usually exophthalmos sets in rather suddenly with swelling of the lids and chemosis, spontaneous and pressure pain, elevation of temperature and visual disturbance, so that the diagnosis of a retrobulbar trouble may be made. The propagation of the pus takes place generally through the bone or through the veins. The diagnosis of sinusitis usually has to be made with the aid of a rhinologist, and the radical removal of the purulent focus should be made by him. In some cases the symptoms are extremely violent and death may occur from a diffuse meningo-encephalitis, or through a localized cerebral suppuration. The symptoms are almost

the same in ethmoiditis and in empyema of the frontal sinus. The abscess is situated in the inner-upper corner, above the tendon of the orbicularis, and the place of perforation is almost always in the inner part of the upper lid, yet the perforation may take place into the lachrymal sac and the conjunctival sac. Empyema of the sphenoidal sinus is never found alone, it is usually caused by thrombophlebitis of the orbit, or by direct extension from the posterior ethmoidal cells. The first sign of a chronic inflammation of the maxillary sinus often is a swelling behind the lower lid which displaces the eyeball upward and so causes diplopia. The chronic form of frontal sinusitis is the mucocoele, which must be differentiated from orbital periostitis and from a cystic empyema. Mucocoeles of the ethmoidal cells present clinical symptoms that are similar, but are situated rather more deeply. In all of these cases there is a more or less marked exophthalmos, with displacement of the eyeball downward and outward in addition to the signs of sinusitis. The group of cases in which diplopia suddenly appears without any other symptoms is particularly interesting. As a rule, these are cases of empyema of the sphenoidal sinus. In general it may be said that an isolated disease of one sinus is a rarity in serious cases. In opening a retrobulbar abscess one should not be content with a simple incision, but should seek out the fistula leading to the diseased sinus and so avoid later sequelæ. In orbital complications the process in the orbit should first be attacked and then the diseased sinus should be treated, except that diseases of the maxillary sinus should be treated first. The nature of the intervention indicated depends on the sinus involved and the severity of the inflammation.

CAUSÉ.

HOLDSWORTH (358, **Orbital cellulitis**) reports a case showing marked exophthalmos from an inflammatory swelling of the orbital tissue. There was an ethmoiditis on the same side with the purulent nasal discharge. Orbital incision and exploration disclosed no pus, but a purulent discharge appeared in the wound two days later. No records of vision or of an ophthalmoscopic examination are given. After two months the eye was in a normal condition and the cosmetic result was satisfactory.

ALLING.

HANSELL (357, **Œdema of the orbits secondary to facial dermatitis**) reports a case that very closely resembled one of facial erysipelas, except that the line of demarcation characteristic of that affection was not present. The left cheek was flushed and swollen, hard, not sensitive, and hotter than the forehead. The right cheek was affected in a similar manner, but to a much less degree. The left conjunctiva was puffy, folded as the eye turned in various directions, and was formed into a ridge by the closing of the lids. The œdema could be shifted about by pressure upon the lower lid with the finger. The eye was unaffected and the vision was good. Injections of streptococcic serum caused the dermatitis on the left side and the orbital œdema to become better promptly, but the increased swelling and infiltration of the skin and orbit on the right side proved that the disease itself was not favorably influenced thereby. No light was thrown on the etiology by examinations of the urine and blood. The symptoms subsided at the end of a week. With regard to the etiology of the condition, it was learned that the patient had resided the year before in northern Canada, where the temperature remained for five months at zero or below, and that the disease was epidemic there. It was attributed to the excessive cold and its sudden cessation, but its cause had not been ascertained.

FOSTER.

### XIII.—CONJUNCTIVA. Reviewed by WOLFRUM.

363. ADDARIO, C. The presence of Prowazek's bodies in the follicles and papillæ of trachoma. *Annali di Ottalmologia*, fasc. 7.

364. ADDARIO, LA FERLA. Prowazek's bodies. *Ibid.*, fase, 6 and 7.

365. BERGMEISTER. Multiple nævus tumors of the conjunctiva. *Arch. f. Ophthalmologie*, vol. lxxxii., No. 3, p. 543.

366. COMNINOS and MARCOGLOU. Chancre of the bulbar conjunctiva. *Arch. d'ophtalmologie*, xxxii., p. 441.

367. DAVIS, A. E., and VAUGHAN, H. Phlyctenular (eczematous) conjunctivitis and keratitis with special reference to etiology and the value of tuberculin as a diagnostic agent, together with the report of forty cases. *Ophthalmic Record*, Sept., 1912.

368. KUTSCHERENKO, P. Prowazek's bodies and their diagnostic importance. *Russk. Wratsch*, 29, 1912.

369. MAY, CHARLES. Treatment of trachoma with radium. The use of radium-covered plates for this purpose. *Ophthalmology*, July, 1912.



370. RUDAS. Pathology of the caruncle. *Klin. Monatsbl. f. Augenheilk.*, September, p. 338.

371. SCHWARTZKOPF. A small epidemic of conjunctivitis caused by the influenza bacillus. *Diss.*, Rostock, 1912.

KUTSCHERENKO (368, **Prowazek's bodies**) was able to find Prowazek's bodies in only 25% of the cases of trachoma that he examined, but he found it in all forms of the disease, independently of its duration and treatment. In the initial stages they were present in about 6%, consequently their diagnostic importance at this time is not great. The size of the bodies, their varieties, their staining, and their existence in various diseases, all argue against their specificity. It is possible that the polynuclear leucocytes that penetrate into the epithelial cells play a considerable part in the formation of Prowazek's bodies as well as in the pouching of the epithelial cells, the destruction of the second nucleus in the cells with two nuclei, and the kinetic figures in the nucleus.

V. POPPEN.

ADDARIO (364, **Prowazek's bodies**) thinks that the intra- and extra-cellular globules of different sizes and almost spherical form, which have an affinity for the basic aniline colors, may not be of a parasitic nature and are of no great importance in the etiology of trachoma, as they are rare in acute cases and may be found in normal organs. The homogeneous appearance of these bodies, the changes in the nucleus and the cytoplasm of the cells, and the fact that they are met with more frequently in the degenerative stage of chronic trachoma, indicate rather that they are products of a hyaline-like degeneration of the cells.

CIRINCIONE.

The elementary or initial bodies of Prowazek exist, according to ADDARIO (363, **Prowazek's bodies**), in the tissue proper of the follicle and papilla of trachoma as well as in the epithelium. This deprives the theory of an epitheliosis of its foundation, and goes to support the idea that trachoma is a specific proliferation of the adenoid layer of the conjunctiva. In acute trachoma the inclusions are found in the epithelium; in the second stage of the disease they are found in greater numbers in the follicles and papillæ.

CIRINCIONE.

The work of SCHWARTZKOPF (371, **Conjunctivitis caused by influenza bacilli**) contains first a full account of the diseases of the eye that are produced by influenza bacilli, which includes not only conjunctivitis, but panophthalmitis and orbital cellulitis. The epidemic that he had an opportunity to observe was confined to 13 children in an almshouse, who came down with the disease almost simultaneously. The interpalpebral space was covered, especially near the inner canthus, with a thick, tenacious, greenish yellow secretion. The palpebral conjunctiva was moderately reddened. Influenza bacilli were found to be present not only by the examination of slides, but also by cultures.

DAVIS and VAUGHAN (367, **Phlyctenular conjunctivitis and keratitis**) in studying their cases used the Pirquet test for diagnosis and the tuberculin injections for therapeutic purposes. Twenty-eight reacted to the test, and in these only was the tuberculin used. Local treatment consisted of boric acid, yellow oxide, and atropine when indicated. Diet and hygienic surroundings were looked after; 65% were cured, 20% improved, 15% unimproved. They believe, as the result of their experience, that tuberculin should be employed in these cases as a diagnostic and therapeutic measure.

ALLING.

To the 26 cases already known of chancre of the bulbar conjunctiva COMNINOS and MARCOGLOU (366, **Chancre of the bulbar conjunctiva**) add another, that of a male 17 years old who came under observation about 3 months after the probable time of infection. In addition to the lesion in the inner-upper part of the bulbar conjunctiva there was an ulceration of the cornea and so great an opacity of the vitreous that the fundus could not be seen, while all the lymphatic glands in the neighborhood were much indurated. Perfect recovery with normal vision followed two injections of salvarsan within ten days.

CAUSÉ.

RUDAS (370, **Pathology of the caruncle**) reports a case of soft fibroma of the caruncle which was as large as a hazelnut and prevented the closure of the lids. The structure of the tumor was found microscopically to be that of a fibroma. This is the fourth case reported.

BERGMEISTER (365, **Multiple nævus of the conjunctiva**)

describes a case of extensive melanosis of the conjunctiva with multiple pigmented tumors. The pigmentation affected especially the upper half of the conjunctiva and extended to the transition fold. The tarsal conjunctiva of the upper lid was thickened, velvety, and covered with masses of tumor, like paving stones, that extended deep into the tarsus. The lower lid was forced away from the eye by a tumor which protruded in its middle portion above the free margin of the lid and covered the lower third of the cornea. When the lower lid was drawn down and the patient looked upward, the tumor, as large as a cherry, was seen to spring from the conjunctival sac. The nasal commissure together with the plica and caruncle were involved in the tumor and stained a gray black. The orbit was exenterated and the lids removed. No recurrence had appeared at the time of writing. The tumor of the caruncle had a markedly sarcomatous character, but the others could not be classified as such; some of them resembled cylindromata, some endotheliomata. It is supposed that the melanosis of the epithelium preceded the formation of the tumors, and that, after the latter had occurred, it gave rise to an intense disease of the conjunctival epithelium and to the formation of tumors from the epithelial cells. In that case this was a combination of melanosarcoma and melanocarcinoma.

Numerous reports of excellent results by this method of treatment are recorded by MAY (369, **Treatment of trachoma with radium**). His own experience, however, with fifteen patients leads him to the conclusion that radium exerts a possible influence upon trachoma, but that eyes treated with sulphate of copper improved more rapidly, and that patients complained more of irritation from the radium than from the bluestone.

ALLING.

#### XIV.—CORNEA AND SCLERA. Reviewed by WOLFRUM.

372. IWANOFF, M. **Treatment of pannus trachomatousus with electrolysis.** *Diss.*, St. Petersburg, 1912.

373. JOBSON, G. B. **Keratotomy for the removal of corneal scars and opacities.** *Ophthalmic Record*, July, 1912.

374. LACOMPTÉ. **A case of parenchymatous keratitis due to hereditary syphilis following linear extraction of cataract.** *Annales d'ocul.*, cxlviii., p. 183.

375. MAGITOT, A. Transplantation of the human cornea previously preserved in an antiseptic fluid. *Jour. Amer. Med. Assn.*, July 16, 1912.

376. MIGLIORINO. Ring abscess of the cornea from general staphylococcic intoxication. *Annali di Ottalmologia*, fasc. 7, 1912.

377. TAKAYASU. Primary fatty degeneration of the cornea. *Archiv f. Ophthalmologie*, vol. lxxxii., No. 3, p. 475.

A little girl had a dense infiltrate appear first in her left eye and then in her right, following a number of subcutaneous abscesses, according to MIGLIORINO (376, **Ring abscess of the cornea from general staphylococcic intoxication**). Recovery, leaving only a small leucoma on her left eye, followed the ordinary treatment together with injections of antistreptococcic serum. The writer believes this to have been a case of parenchymatous keratitis caused by intoxication through the aqueous.

CIRINCIONE.

The disputed question whether the parenchymatous keratitis of hereditary syphilis can be excited by traumatism is raised again by the case reported by LACOMPTE (374, **Parenchymatous keratitis due to hereditary syphilis following linear extraction of cataract**). A girl 15 years old, who presented a history and unquestionable clinical signs of congenital syphilis, underwent a linear extraction for cataract in an otherwise normal eye. On the third day after the operation a typical parenchymatous keratitis appeared, starting from the wound. Three months later the other eye, which had been successfully operated on 7 years before, was attacked by the same disease. The three fundamental conditions demanded by Terrien for a traumatic parenchymatous keratitis, previous perfect integrity of the injured organ, unquestionable traumatism, and immediate connection in time between the traumatism and the disease, were all present in this case. Of the secondary demands, the one that one eye alone shall be affected is not present. It is also to be noticed that the patient was at the typical age for the development of a parenchymatous keratitis.

CAUSÉ.

TAKAYASU (377, **Primary fatty degeneration of the cornea**) describes two cases of spontaneous fatty degeneration of the cornea. Trachoma was present in both, but he does not consider that it had any causal connection with the corneal



trouble. White spots appeared on the cornea, which were at first small, but gradually increased in size. They were of various sizes, punctate, rod-shaped, and formed here and there a network. The opacities extended to a considerable depth into the parenchyma of the cornea, and were composed of minute fibers that radiated from their margins. Vessels extended from the margin of the cornea to the opacities. The cornea was of a dirty gray color. The trachoma was completely cured in both patients. Small pieces were excised from the affected portions of the cornea and examined microscopically. Abundant deposits of fat were to be seen, distributed most freely within the lamellæ, but present also in Bowman's membrane and in the basal cells of the epithelium. Bowman's membrane was destroyed in some places, greatly reduced in others. The author was able to find only one similar case on record.

JOBSON (373, **Keratotomy for the removal of corneal scars and opacities**) suggests dissecting off cicatricial tissue from the cornea until clear lamellæ are reached. He has operated on fifteen cases, but gives the results of only two, which were successful. The useless condition of an eye with deep corneal scars makes any reasonable method worthy of consideration, but the danger of infection, and the probability of recurrence of the opacities, call for further proof of the value of this procedure.

ALLING.

MAGITOT (375, **Transplantation of the human cornea previously preserved in an antiseptic fluid**) employs hæmolyzed blood serum from a different animal of the same species, and is able to preserve the eye with perfectly clear media at a temperature of 5° to 8° C. for fourteen days. To prove that the vital processes in the tissue are not destroyed, he resorted to transplantation of a section of the preserved cornea into an excavation made in the cornea of a live animal. These experiments were satisfactory. He has also performed one keratoplasty on the human subject. A boy was found with a large cicatricial pterygium, the result of a burn, and a cornea entirely opaque except for a small peripheral area. The vision was  $\frac{1}{17}$ . The corneal tissue for transplantation was obtained from an eye enucleated a week previously for absolute glaucoma and preserved in serum. The pterygium was

dissected off and the transplantation performed without suturing. After nearly a year the graft remained perfectly transparent, appearing like a window in the opaque wall, and the vision was  $\frac{1}{4}$ . If the ability to prolong the life of tissue is established, keratoplasty will find a wider field, since up to this time the experiments have been confined to transplantation from the fresh eye.

ALLING.

In cases of grave trachoma IWANOFF (372, **Treatment of pannus trachomatousus with electrolysis**) has often obtained good results by means of electrolysis. In trachomatous pannus an electric peritomy is performed on the scleral conjunctiva, sometimes destroying at the same time the superficial vessels of the cornea. The strength of the current used for the peritomy should not be less than 2 milliamperes, nor more than 3. The sittings should not last longer than 3 or 4 minutes. For the cornea the current should be only 1 m. a., and the time of touching each place not more than from five to seven seconds. In order to obtain the best effect in grave pannus, the sittings should be repeated in from three to seven days, after all the signs of reaction have disappeared. The disappearance of the vessels and of the opacity is accelerated decidedly by the electrolysis. In granular trachoma the granules may be caused to disappear without the formation of cicatricial tissue by electrolysis with knob-shaped electrodes, but this is of little help in deep infiltration and œdema of the conjunctiva. It is of good service in trichiasis by destroying the lashes. The current in these cases is from 1½ to 2 m. a., the sitting from 1 to 1½ minutes long. Ordinary steel needles are better than those of platinum.

V. POPPEN.

#### XV.—IRIS AND PUPILS. Reviewed by NICOLAI.

378. BISTIS. Paralysis of the sympathetic in the etiology of heterochromia. *Arch. d'ophtalmologie*, xxxii., p. 578.

379. FEJER, J. Aniridia congenita bilateralis. *Zentralbl. f. prakt. Augenheilkunde*, August, p. 227.

380. HOENIG, A. Hæmangioma simplex iridis ad marginem pupillæ. *Ibid.*, August, p. 229.

381. NONNE. Clinical and anatomical study of a case of isolated true reflex immobility of the pupil without syphilis in grave chronic alcoholism. *Neurologic. Zentralblatt*, 1912, No. 1.

382. ROCHAT. Deposits on the cornea in cyclitis. *Nederl. Tijdschr. v. Geneesk.*, 1912, ii., No. 7.
383. SATTLER, C. H. Vermiform twitchings of the sphincter pupillæ. *Klin. Monatsbl. f. Augenheilkunde*, September, p. 349.
384. STRAUB. Cyclitis, deposits on Descemet's membrane, and cloudiness of the vitreous. *Nederl. Tijdschr. v. Geneesk.*, 1912, i., p. 125.
385. TOCZYSKI, F. The influence of dionin upon the pupil and tension of normal eyes. *Zeitschrift f. Augenheilkunde*, July, p. 32.
386. WESTPHAL, A. Another contribution to the pathology of the pupil. *Deutsche med. Wochenschrift*, 1912, No. 38.

After a compilation of the published cases of heterochromia connected etiologically with paresis of the sympathetic, BISTRIS (378, **Paralysis of the sympathetic in the etiology of heterochromia**) describes the case of a woman 38 years old, delicate but otherwise in good health, in whom a normal fundus had been found at a previous examination for glasses. The heterochromia had appeared two years before, coincidentally with ptosis, meiosis, enophthalmos, and atrophy of one side of the face. The left iris was brown, but the right was gray blue, with slightly obscured markings and a little atrophy. In addition there were deposits on the posterior surface of the cornea and an insufficient dilatation of the pupil to cocaine. Probably, because of the coincident neuralgia of the trigeminus, there existed, together with the affection of the cervical sympathetic, a similar trouble of the sympathetic ganglia in the head. CAUSÉ.

FEJER'S (379, **Aniridia congenita bilateralis**) case is interesting because of the good vision of the patient, almost  $\frac{5}{10}$ . The man was able to do good work as a cobbler and did not suffer from dazzling. Small striated opacities could be seen in the lens. Nothing could be seen of the mechanism of accommodation, advance of the ciliary processes, and reduction of the space about the lens, even with eserine. No traces of the irides could be seen. The refraction was between 3 and 4 D. of myopia without astigmatism.

HOENIG (380, **Hæmangioma simplex iridis**) saw a little triangular hæmatoma, looking like three little red berries, near the margin of the left iris of a man 47 years old. Such hæmangiomas are rare, although the iris is predisposed to the formation of tumors of various kinds because of its vascularity. Vision was reduced to  $\frac{5}{50}$  by corneal opacities.

STRAUB (384, **Cyclitis, deposits on Descemet's membrane, and cloudiness of the vitreous**) ascribes the cloudiness of the vitreous to an accumulation of leucocytes induced by toxines. It is to be seen in both the syphilitic and the tuberculous forms of the disease. He also ascribes the swellings of the papilla, the tubercles at the pupillary margin of the iris, and the delicate deposits on Descemet's membrane to the action of toxines.

ROCHAT (382, **Deposits on the cornea in cyclitis**) examined these deposits in two eyes enucleated on account of tuberculous cyclitis. The smallest, most recent deposits are heaps of round cells upon intact endothelium. They sink in the aqueous from their own weight and adhere to the cornea. They increase in size by agglutination, perhaps under the influence of bacterial toxines and through proliferation of the endothelial cells. VISSER.

SATTLER (383, **Vermiform twitchings of the sphincter pupillæ**) finds that the vermiform twitchings of the iris sometimes occur in normal eyes, and that they are particularly distinct when the pupils react slowly or not at all. The explanation of the phenomenon given by Muench, that in weak illumination weak currents of innervation for the adaptation of the retina are able to excite only individual segments of the sphincter, is not applicable to all cases.

NONNE (381, **Reflex immobility of the pupil in chronic alcoholism**) saw a clearly defined reflex immobility of the pupil, with a slight mydriasis, in an alcoholic 51 years old. There were no signs of either syphilis or tabes. No traces of syphilis could be found on autopsy. This is a rare case, for this pupillary phenomenon is almost never observed to be due to toxic influences.

WESTPHAL (386, **Pathology of the pupil**) reports three interesting cases. 1. A woman was attacked by migraine, at first occasionally but later chronically, associated with mydriasis and absolute immobility of the pupils after cessation of her menses. She had other vasomotor disturbances. The case was one therefore of a periodic condition in the oculomotor region resembling paresis, in which only the pupillary branch was involved. A similar pupillary condition that alternates with a normal, is met with in katatonia. It



is difficult to explain the symptoms; vasomotor disturbances and psychic influences certainly play a part. 2. A patient with no signs of tabes, syphilis, or general paresis, in whom a dilatation of the pupil to light preceded a minimal partial contraction that was visible microscopically. This is apparently a case of paradoxical light reaction. In such cases attention should always be paid to the partial minimal changes with the aid of the loupe, and the peculiar action of the muscles of the iris should be studied. 3. A patient with manic conditions of excitement showed a pupillary reaction very like the neurotonic. The pupil contracted to light and then remained in a condition of spastic neurosis until it began to dilate gradually after the room had been darkened.

TOCZYSKI (385, **Influence of dionin upon the pupil and tension**) says that the pupils usually contract at first and afterward dilate. The contraction takes place at the same time as the chemosis. The dilatation is not constant. The tension is elevated at first, but later returns to or falls below normal. There appeared to be no constant relation between the pupil and the tension.

XVI.—LENS. Reviewed by NICOLAI.

387. ELSCHNIG. **Treatment of senile cataract.** *Med. Klinik*, No. 27.

388. ROEMER. **Pathogenesis of cataract.** *Berl. Ophthalm. Gesellsch.*, July 17, 1912.

389. WIEDERSHEIM, O. **Expulsive hemorrhages after cataract extraction.** *Inaug. Diss.*, Stuttgart, 1912.

ROEMER (388, **Pathogenesis of cataract**) found in the blood serum of a young person with diabetic cataract substances which were able to rapidly break down lens albumin with the production of toxic products of metabolism. These are not found in the same concentration in normal human blood serum.

KOELLNER.

ELSCHNIG (387, **Treatment of senile cataract**) says that the prevention of senile cataract lies in the treatment of diathesis, sclerosis, and metabolic changes, while a limit can scarcely be given to the operative treatment. All ages are suited to the operation, and even diabetics with little sugar may be operated on. A postoperative iritis is generally due to infection, so he recommends thorough irrigation of the

conjunctival sac with a solution of oxycyanate of mercury. A round pupil is ideal. Prolapse of the iris is best avoided by excision of a piece of the iris at its base. Iridectomy is indicated in cases of general diseases, prominent eyeballs, and unruly patients. The incision at the margin of the cornea should be covered by a conjunctival flap.

One of the most unfortunate complications of extraction of cataract is the expulsive hemorrhage, but luckily it is not very common. According to the statistics compiled by WIEDERSHEIM (389, **Expulsive hemorrhage after cataract extraction**), the figures vary from 1.1% to 0.04%. The causes are changes in the blood-vessels, associated with the fall of tension when the eyeball is opened, and some other factors, such as loss of vitreous. The hemorrhage is usually arterial, seldom venous, chiefly from the ciliary arteries. Therapeutically absolute rest, a pressure bandage, compresses of ice, ergotin, morphine, and injections of gelatine may be employed, but finally comes enucleation.

#### XVII.—VITREOUS. Reviewed by KÜMMELL.

390. MAGITOT and MAWAS. **The development of the human vitreous and zonule.** *Annales d'oculistique*, cxlviii., p. 179.

MAGITOT and MAWAS (390, **Development of the human vitreous and zonule**) divide the development of the vitreous and zonule into three stages: the primary, the transitory, and the final vitreous. The vitreous is an ectodermal formation coming from the neuroglia. Its first rudiment consists of a fibrillary proliferation of the basal fibres in the marginal zone of the embryonal retina. Up to the seventh week the lenticular vesicle takes part in its formation by thread-like processes from the lenticular cells. As early as the beginning of the fourth week the hyaloid system of vessels, formed from mesodermal elements, appears in the secondary optic vesicle and extends quickly to the orbit; these elements are confined wholly to the formation of vessels. Toward the end of the eighth week appears centrally the "transitory" vitreous, surrounded by the hyaloid vessels as by a sheath, composed of a transiently existing proliferation of the ectodermal neuroglia of the optic nerve, coming from the papilla. It reaches its maximum at the end of the third month and is then re-

placed by the retinal secretion. The final vitreous results from the redevelopment of the primordial, which sets in briskly with the fourth month. At this time the ciliary body is differentiated and the rudiments of the ora serrata are present; from this time on these two assume the principal part in the formation of the vitreous. Mueller's cells grow into a dense, delicate plexus that fills the interior of the eye. The most anterior fibers are inserted into the capsule of the lens and so form the zonula. There is no central canal and no hyaloid membrane. The vitreous and zonula are formed from neuroglia which is adapted to the optical purposes.

CAUSÉ.

XVIII.—CHORIOID. Reviewed by KÜMMELL

391. ALT, ADOLPH. **Microscopical examination of the eye in the case of chorioidal tumor reported by Dr. Green.** *Am. Jour. of Ophthalm.*, June.

392. GREEN, JOHN, JR. **Sarcoma of the chorioid.** Unusual clinical features. *Ibid.*, June.

The case of sarcoma of the chorioid reported by GREEN and examined by ALT (391 and 392, **Sarcoma of the chorioid**) is of some interest because the patient's attention was first called to the trouble in his eye during an attack of pertussis. Green thinks that prior to the attack of pertussis a minute paramacular growth had slightly separated the overlying retina, and that during a severe coughing spell the separation suddenly became more extensive, though still sharply limited to an area corresponding to not more than two disk diameters. The tumor then enlarged very slowly without occasioning any greater degree of retinal detachment. A subretinal hemorrhage then appeared, and finally a mass could be seen projecting into the vitreous. The eye was enucleated and the tumor was found by Alt to be a sarcoma confined to the macula and permeated with hemorrhages.

GILBERT.

XIX.—SYMPATHETIC OPHTHALMIA. Reviewed by KÜMMELL.

393. COPPEZ. **A case of sympathetic ophthalmia.** *Arch. d'ophtalm.*, xxxii., p. 591.

394. KOMOTO. **Deafness in sympathetic ophthalmia.** *Klin. Monatsbl. f. Augenheilkunde*, August, p. 129.

395. WEEKERS. **Pseudo-sympathetic ocular neurosis.** *Arch. d'ophtalm.*, xxxii., p. 409.

396. WISSMANN. A contribution to sympathetic ophthalmia. *Klin. Monatsbl. f. Augenheilkunde*, September, p. 367.

WISSMANN (396, **Sympathetic ophthalmia**) describes a case in which the outbreak of sympathetic ophthalmia took place 26 years after the injury.

COPPEZ (393, **Sympathetic ophthalmia**) reports a case of penetrating wound in the sclero-corneal region in which he did not perform enucleation, as is his custom. Treatment consisted of, in addition to local remedies, Heurteloup's leech, inunctions of mercury, the use of salicylic acid and pilocarpine, and subconjunctival injections. An injection of salvarsan was of no benefit. The wounded eye retained a vision of 0.4, the other one of 0.7. Coppez emphasizes the fact that wounds of the ciliary region are especially prone to induce sympathetic ophthalmia. Deep lime burns of the cornea and iris likewise may easily excite this disease. Injection of the papilla and peripapillitis frequently precede the inflammatory changes in the iris and ciliary body. Enucleation is necessary, even when the wounded eye still retains the power of vision.

CAUSÉ.

WEEKERS (395, **Pseudo-sympathetic ocular neurosis**) designates as a pseudo-sympathetic neurosis a symptom-complex that he has observed in four cases. With no signs of irritation of the eye that had been injured, and even when this had been enucleated long before and no stump sensitive to pressure could be found in the empty orbit, these patients complained of impairment of vision of the healthy eye, of concentric or partial contraction of the visual field, of photopias, in short of purely functional, psychic disturbances, which were usually almost completely relieved by suggestive treatment. Beyond doubt this was a neuropathic disease and not a sympathetic affection. The question of sympathetic irritation, and of sympathetic amblyopia, is still much debated. Under the latter name sympathetic retrobulbar neuritis and neuro-retinitis sympathica have been described. An amblyopia may be supposed to be sympathetic only when the injured eye is in a state of irritation, when the sympathizing eye shows no objective lesion, and when the possibility of a pseudo-sympathetic neurosis can be excluded with certainty.

CAUSÉ.



KOMOTO (394, **Deafness in sympathetic ophthalmia**) reports the following case. Wound of an eye by a splinter of wood with prolapse of the iris. Recovery prompt at first. Reprolapse of the iris about four weeks after the injury, with marked signs of inflammation of the iris. Exudate in the anterior chamber. Rise of temperature to above 38° C., with slowing of the pulse. Six days later sympathetic inflammation of the other eye, serous iritis, with severe headache, and on the ninth day almost total deafness with some slight disturbances of consciousness. After enucleation of the injured eye the general symptoms disappeared, but the sympathizing eye and the deafness, which was of cerebral origin, did not materially change. Later the deafness passed away. Deafness appears in these cases almost always without preliminary symptoms, sometimes accompanied by headache and delirium. The prognosis is bad, but two recoveries are recorded, this one and a case reported by Sachs. Only seven cases in all have been reported. Enucleation is of the most beneficial influence, yet the deafness persists for some months. Perhaps it may be due to an extension of the inflammation, that proceeds along the pial sheath of the optic tracts of conduction, to the auditory nerve, but the supposition that there is a slight meningitis seems to be more probable. The deafness is still more easily explained as metastatic, and similar to the diseases of the labyrinth met with in syphilis, mumps, and other infections.

#### XX.—GLAUCOMA. Reviewed by KÜMMELL.

397. DUTOIT. **Experiments with the internal treatment of glaucoma with iodine.** *Zeitschrift f. Augenheilkunde*, August–September, p. 131.

398. GILBERT. **Pathology, pathogenesis, and treatment of glaucoma.** *Archiv f. Ophthalmologie*, vol. lxxxii., 3, p. 389.

399. SHUMWAY, E. A. **Secondary glaucoma in interstitial keratitis, with report of a case.** *Annals of Ophthalmology*, July, 1912.

400. STRANSKY. **Anomalies of the scleral tension.** Vol. i. Glaucoma inflammatorium, the aged eye, scleral scars, glaucoma simplex. Leipzig and Vienna. F. Deuticke, 1912.

401. WICHERKIEWICZ. **Crucial posterior superficial sclerotomy.** *Annales d'oculistique*, cxlviii., p. 1.

GILBERT (398, **Pathology, pathogenesis, and treatment of**

**glaucoma**) points out that no indication of the form of glaucoma present can be found in the height of the tension; that it is often higher in simple than in inflammatory glaucoma, so that much can be said against Heerfordt's division into lymphostatic (glaucoma simplex) and hæmostatic (glaucoma inflammatorium) forms. Among other things the influence exerted by the refraction is considerable. In 186 cases he found hypermetropia in 38% of simple, and 77% of inflammatory glaucoma, while myopia was present in 31% of the former and in only 12% of the latter. The age of the patients varies in the different forms. It was between 30 and 60 years in 50% of the cases of inflammatory glaucoma, but in only 36% of those of simple; hence the inflammatory variety is met with more often in hypermetropic eyes and in younger persons than the simple. Tonometry, the visual fields, and the measurement of the blood pressure are efficient aids in the differential diagnosis, especially in the early stages. The author then passes to the connection with general diseases, especially those associated with an increase of the blood pressure. He could not demonstrate an increase in the adrenalin contained in the blood, as claimed by Kleczkowsky. He does not agree with Bjerrum in thinking that inflammatory glaucoma is a true inflammation produced by a very problematic morbid agent. On the contrary, he regards as the cause of the intraocular increase of tension a general circulatory disturbance associated with an increase of the blood pressure which leads to increased transudation in connection with local vascular disease, increase of the capillary pressure, and venous engorgement. The blood pressure is generally higher in inflammatory than in simple glaucoma. In the latter the tension is relatively independent of the blood pressure. The eye that is not hypermetropic with glaucoma simplex can adapt itself to a high blood pressure without any considerable increase of tension. Yet high tension may occur in glaucoma simplex with a low blood pressure as the result of local vascular changes. Therapeutically he recommends reduction of the blood pressure. The tension in inflammatory glaucoma may be temporarily reduced from 25 to 50mm by venesection; the decrease is less in glaucoma simplex. Venesection is indicated in the prodromal stage, in inoperative glaucoma

simplex, after operation in every form of glaucoma, and finally to reduce tension before operation. After the blood pressure has been reduced in this manner the intraocular tension falls, to rise again when the former has again increased. Dietetic treatment of the fundamental cause, the vascular disease, must also be undertaken. Meiotics usually produce a somewhat greater reduction of tension than venesection, but their effects quickly pass away. Pilocarpine and dionin reduce the tension strongly and quickly. Subconjunctival injections of sodium citrate gave bad results in two cases. Iridectomy regulated the tension in inflammatory glaucoma for a period of from 1 to  $2\frac{1}{2}$  years in only 4 out of 16 eyes; in the other an increase of tension reappeared sooner or later. Iridotomy reduced the tension quickly and permanently in 14 eyes with simple and inflammatory glaucoma, but this method has several technical faults. A comparison of the effects produced by iridectomy and iridotomy with those obtained by venesection shows that the operations reduce the tension better and more permanently, yet the cases that respond badly to venesection have a bad prognosis as regards the results of operation. He operates as quickly as possible in an acute attack, but only in the prodromal stage of simple glaucoma when prolonged freedom from prodromata cannot be obtained by venesection. Regarding the bad results of operation he often finds, after iridectomy, cyclodialysis, sclerectomy, scleral trephining, and iridotomy, a rapid loss of function, both of the central and of the peripheral vision. We must therefore proceed as carefully as possible therapeutically in glaucoma simplex and not seek unconditionally to reduce the increased tension.

STRANSKY (400, **Anomalies of the scleral tension**) calls attention to a point that has been overlooked many times, the involvement of the sclera in the so-called tension of the eye, the resistance of the globe measured with the finger or the tonometer, and brings out the individual factors which work together to create the resistance of the globe, the internal pressure, the hardness, rigidity, and tension of the sclera, as well as the way in which these work together. He believes that in age the resistance of the globe increases, while the tension of the sclera diminishes, so that the elderly eye is smaller

on the average, and hence the circumlental space is contracted and the diaphragm, composed of the lens and iris, is pushed forward. Under pathological conditions, an increase of resistance analogous to this to a certain degree physiological increase may take place in consequence of a simple chronic inflammation, and Stransky is convinced that the nature of the so-called simple glaucoma is not an increase of tension, but a chronic inflammation of the sclera which leads to an increase of the scleral resistance through a new formation of connective tissue, and thus to an elevation of the resistance of the globe which can be detected by palpation. He would substitute for the name glaucoma simplex that of "*scleritis indurativa*." The condition known as glaucoma simplex without increase of tension, or, by Horstmann, with amaurosis and excavation of the optic nerve, he calls *scleritis indurativa postica*, while the term *scleritis indurativa antica* is used to designate a condition of increased resistance of the globe and hyperæmia of the anterior ciliary vessels. When the *scleritis indurativa* involves all parts of the capsule of the eyeball, producing glaucoma simplex with increase of tension, the name used is *scleritis universalis*. After describing the symptomatology of *scleritis indurativa* and the new formation of connective tissue found in the sclera, he passes to the sequelæ of this form of inflammation, the change in the form of the eyeball and of the lamina cribrosa. Indurative *scleritis* involves the lamina and causes in it a new formation of connective tissue. The author tries to show that the intraocular pressure extends behind the lamina through the layers of fluid between the nerve fibers and the bundles of the lamina, so that the latter is subjected to the same pressure in front and behind, and that consequently there can be no "pressure excavation." He explains the outward bulging of the lamina as due to the contraction of the foramen scleræ together with an enlargement of the surface of the lamina by an increase in the number of its connective-tissue elements. The production of atrophy of the optic nerve by the pressure of the lamina upon the sheaths of myelin, and the differentiation between *scleritis indurativa* and acute glaucoma can only be mentioned. Finally he deals with the predisposition of eyes that are senile and that are



affected by scleritis indurativa to inflammatory glaucoma, and with a combination of these two diseases.

DUTOIT (397, **Internal treatment of glaucoma with iodine**) agrees with the majority of modern writers that arteriosclerosis is of considerable importance in the origin of glaucoma, and that the prophylaxis of the latter disease is the same as the treatment of the former, while operation is usually indicated when glaucoma has actually appeared. The signs of the "présclérose," of the just preceding condition caused by sclerosis, are mainly demonstrable clinically in the increase of the blood pressure and the changes in the cardiac action not due to rigidity of the vessels or to albuminuria. Among these are tortuosity of the subconjunctival veins, together with thickenings of their walls, and similar changes in the vessels of the iris, retina, and chorioid. We do not know with perfect certainty the details of the connection between the vascular disease and glaucoma; the exciting factor indeed is still unknown, yet we find clinically all transition stages from latent sclerosis with fluctuations of the blood pressure and of the intraocular tension with cardiac troubles without glaucoma on the one hand, to true glaucoma with the same or greater general symptoms on the other. As regards the value of treatment with iodide of potassium of the fundamental disease, he reports several cases of latent vascular sclerosis and changes predisposing to glaucoma which remained for years free from glaucoma, or from an increase of the general sclerotic disturbances. Benefit from the same treatment can be obtained even when the glaucoma has already appeared, though naturally only to a certain degree. Small doses, 1.5 to 3.0 daily, are recommended to be taken for years.

WICHERKIEWICZ (401, **Crucial posterior superficial sclerotomy**) recommends in simple or hemorrhagic glaucoma to lay bare the sclera, to make from 4 to 6 superficial, parallel incisions in a meridional direction in it, and then the same number in a direction vertical to the former. When the tension is much elevated, one of the meridional incisions may be made down upon the chorioid for a distance of 3 or 4 mm. An important part of the after-treatment is that the eye be massaged for about ten days. He gives the clinical his-

tories of 17 cases of various forms of glaucoma successfully treated in this manner. In particular he claims that the operation is devoid of danger. Possibly it might be of good service also in keratoconus and keratoglobus.

CAUSÉ.

Changes in the intraocular pressure during the course of interstitial keratitis have long been observed. Softening of the eye, according to v. Graefe, is not uncommon. Increased tension is very rare. It occurs late in the disease and at times only after years. SHUMWAY (399, **Secondary glaucoma in interstitial keratitis, with report of a case**) cites a typical case of interstitial keratitis which had been under observation for six years. During this period the patient had suffered from three attacks of inflammation. After a year's freedom from trouble he noticed in December, 1911, that the eyes were congested and that the vision had failed. In the following February the tension was found to be increased and the optic disks to be cupped. The Lagrange operation was performed in each eye. There are two causes for the glaucoma. It may be secondary as the result of the occlusion of the pupil accompanying the iritis, or it may be caused by increase of the albumin in the aqueous, or to pathological changes at the iris angle.

ALLING.

#### XXI.—RETINA. Reviewed by MEYER.

402. ADAM. Anatomically displaced macula lutea. *Transactions of the Berlin Ophthalmological Society*, July 17th.

403. BEGLE, HOWELL L. A clinical report of three cases of retinitis circinata. *American Journal of Ophthalmology*, September, 1912.

404. BETTREMIEUX. Technique and mode of action of the operations recently proposed for detachment of the retina. *Annales d'oculistique*, cxlviii., p. 123.

405. COPPEZ. Ocular complications of hypertrophic osteitis deformans. *Archives d'ophtalmologie*, xxxii., p. 529.

406. GROES-PETERSEN. Retino-chorioiditis (Edmund Jensen). *Clinische Monatsbl. f. Augenheilkunde*, August, p. 159.

407. LASAREFF. Three cases of hole-like defects in the macula lutea produced by the direct action of the sun's rays, and a similar case of traumatic origin. *Westnik Ophthalmol.*, July, 1912.

408. NUEL. Spotted degeneration of the macula lutea. *Archives d'ophtalmologie*, xxxii., p. 465.

ADAM (402, Anatomically displaced macula) demonstrated

a peculiar anomaly that apparently has not been hitherto observed. A student came to him with a strabismus divergens and sursumvergens of about  $10^{\circ}$  to  $15^{\circ}$ . When the squinting eye was forced to fix, it remained in its strabismic position, and yet, in spite of the excentric fixation, the vision was perfectly normal. Examination with the ophthalmoscope revealed that the macula lutea was situated upward and outward from the papilla, so that the patient was in fact fixing on his macula. The distribution of the retinal vessels also was unusual, in that the lower part of the retina was almost free from the larger branches. Some white bands, possibly of connective tissue, extended from the papilla to the macula. Stereoscopic vision was not present. When the patient wished to lose sight of a mark in the blind spot the line connecting the mark and the point of fixation had to be vertical instead of horizontal.

KOELLNER.

BEGLE'S (403, **Three cases of retinitis circinata**) report includes one typical and one incipient case, together with a third that was complicated by patches of pigment and glaucoma. All of the patients presented incipient cataract and general arteriosclerosis, but only slight changes in the retinal vessels and no hemorrhages.

GILBERT.

BETTREMIEUX (404, **Detachment of the retina**) describes the technique and mode of action of the more recent operations for detachment of the retina. He considers sclerectomy to be the best procedure, as he has obtained favorable results in quite a number of cases with it. In many of them the operation had to be repeated two or three times. On the ground of the observation that the aqueous escapes under high pressure in iridectomy, he explains the action of sclerectomy to be that by it new anastomoses are opened between the deep and the superficial plexuses of vessels which render the conditions more favorable for the intraocular change of fluid. The formation of these new anastomoses can be followed with the binocular loupe. He does not consider Lagrange's cauterization of the pericorneal outer layers of the sclera to be any better than simple sclerectomy.

CAUSÉ.

COPPEZ (405, **Ocular complications of hypertrophic osteitis deformans**) observed the appearance of little yellowish patches

of degeneration in the maculæ of four patients suffering from Paget's disease. These patches caused more or less extensive central or paracentral scotomata; frequently they formed by confluence a large atrophic spot, and they were often accompanied by punctate hemorrhages. All of the patients were old and presented arteriosclerotic and neuro-arthritic symptoms. Probably the lesion in the macula is caused by the same unknown agent as the bone disease. In one case diplopia was due to displacement of the trochlea by the osteitis. All of the patients had incipient cataract, but this was operated on in only one. No treatment is known.

CAUSÉ.

GROES-PETERSEN (406, **Jensen's retino-chorioiditis**) reports 15 cases of retino-chorioiditis, which is so well characterized that he considers it should be known, from the author who first described it, Jensen's retino-chorioiditis. Its characteristic seat is near the healthy papilla of one eye. Small hemorrhages are to be found in the retina. The patients scarcely note the defects present in the visual field, which are, according to the writer, radial defects in the layer of nerve fibers caused by compression. They are stationary and sharply defined. The disease has a decided tendency to recurrence, which always takes place in the old situations. Floating opacities appear in the vitreous. The vision of the patients is disturbed only for as long as the opacities are present, therefore the prognosis is good. In many cases the size of the patch is marked in comparison with the little defect.

LASAREPF (407, **Holes in the macula**) observed three cases of injury in the fundus produced by the direct rays of the sun. In the first case there was a red disk in the macula with about it a narrow ring of grayish white, cloudy retina. Distinct yellow points could be seen on the red surface. There was a well marked central scotoma; vision 0.3 or 0.4. The visual field and the color sensation were normal. The refraction was emmetropic. Otherwise the eye showed no changes; the right eye was normal. In the second case the patient complained of a slight cloud in front of his left eye and a dark spot in front of his right. The ophthalmoscopic picture within his right eye was quite identical with that in the preceding case, except that the diameter of the defect



was less than half a papilla, and that the parallactic signs were weaker. In the third case the hole in the macula was larger, equal in diameter to half the papilla. In the fourth case the retina at the posterior pole, including the macula, was cloudy as the result of a traumatism, allowing the red point in the center of the macula to be seen very well, together with a second dark red area with its longer diameter vertical, about the size of half a papilla, with sharply defined margins. Parallactic movements could not be made out at first, but were plainly visible after a couple of days. The scotoma was absolute. Evidently this was a simple laceration of the retina, while in the other, non-traumatic, cases a necrosis took place of the central and thinnest part of the macula.

V. POPPEN.

NUEL (408, **Spotted degeneration of the macula**) had the opportunity to examine anatomically one of these rare cases. The disease usually appears in elderly, arteriosclerotic persons, appears simultaneously in both eyes, producing a great impairment of the vision and a central scotoma, without any change in the peripheral portion of the field. It is not common for improvement to appear in the course of the disease, yet it does not cause total blindness. In the macula, which is the sole seat of the disease, appear a large number of small, roundish, yellow-red spots with indistinct margins, while the rest of the fundus remains normal, as a rule, except for a paleness of the temporal side of the papilla, which appears later. A certain torpor of the retina is characteristic. A homogenous exudate is formed between the vitreous lamella of the chorioid and the pigment epithelium, and becomes thickened in various places so as to give rise to the clinically visible roundish nodules. Above and below this layer of exudate with its nodules, the pigment epithelium and vitreous lamella are normal. The exudate is probably a chorioidal product. The picture resembles that of the colloid deposit on the vitreous lamella, except that the degenerative changes in the latter are slow, isolated, and may be observed in the periphery of the fundus. The disease is not traumatic as it is met with in eyes that have not been injured.

CAUSÉ.

## XXII.—OPTIC NERVE AND VISUAL TRACT. Reviewed by MEYER.

409. DUCAMP. A case of familial retrobulbar neuritis. *Annales d'oculistique*, cxlviii., p. 48.

410. HARNACK, E. Acute blinding by methyl alcohol and other poisons. *Muenchener med. Wochenschrift*, No. 36, p. 1941.

DUCAMP (409, **Familial retrobulbar neuritis**) reports the cases of two sisters, 20 and 28 years of age, both of whom suffered from retrobulbar neuritis, and describes the condition as one of familial retrobulbar neuritis, probably due to hereditary syphilis. A perfect cure was obtained in the younger sister by an energetic mercurial treatment, while in the elder, in whom the disease was the more grave, the Wassermann reaction, which was positive at first, became negative in the course of the treatment. A central scotoma with disturbance of the color sense persisted in each eye of this sister. CAUSÉ.

HARNACK (410, **Acute blinding by methyl alcohol and other poisons**) comes to the following conclusions: Of the substances which can cause acute toxic blindness, methyl alcohol, nitrous acid, and atoxyl, which are otherwise so different, have one factor in common, that they produce their effects by the oxidizing action of the oxygen in the nervous elements of the eye. The blindness is due to acute, inflammatory degenerative processes in which these nervous elements are involved. With other poisons, on the contrary, such as quinine, cocaine, and probably filix mas, the acute blindness is produced in quite a different way, by a severe spasm of the retinal vessels, which may lead to obliteration of the vessels and consequent atrophy of the nervous elements, just as in embolism of the central artery.

Fig. 1.



Fig. 3.

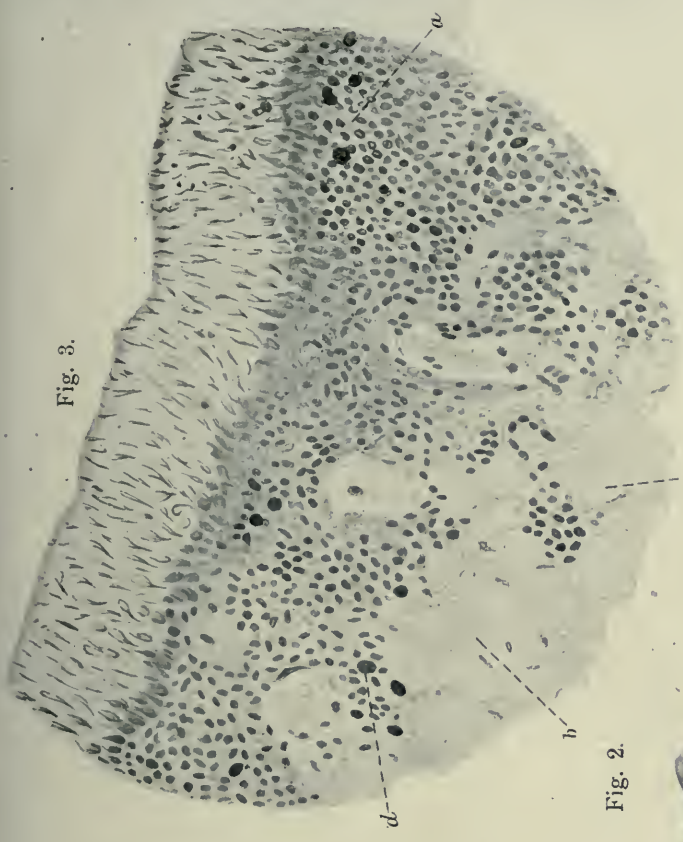


Fig. 2.



Eye, Ear, Nose & Throat Hospital





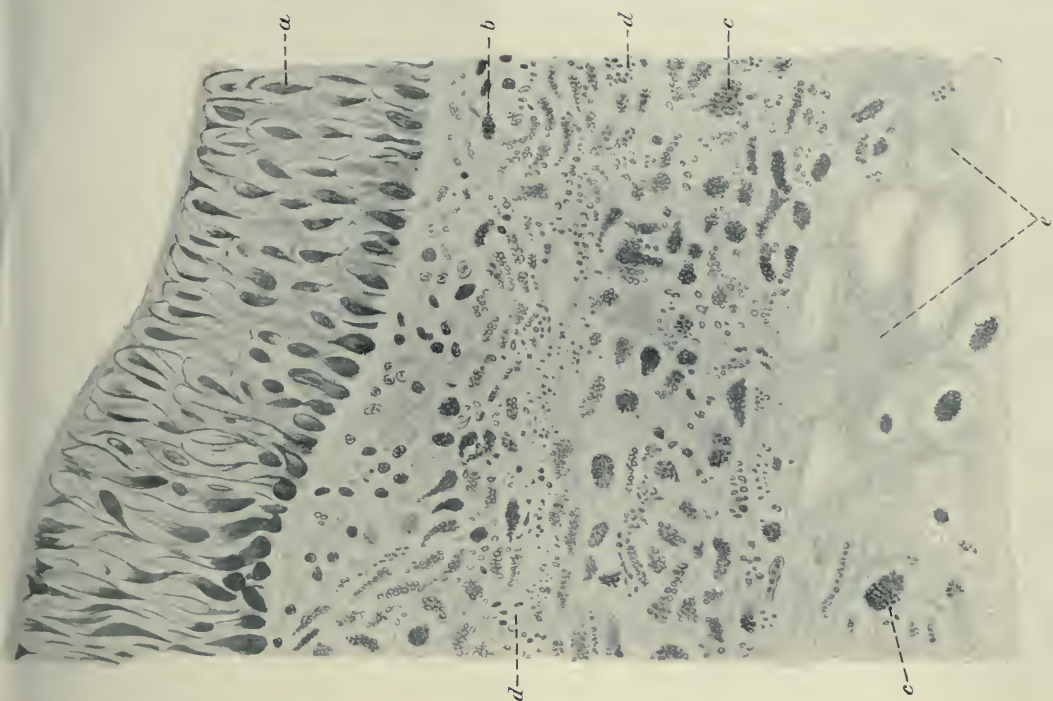
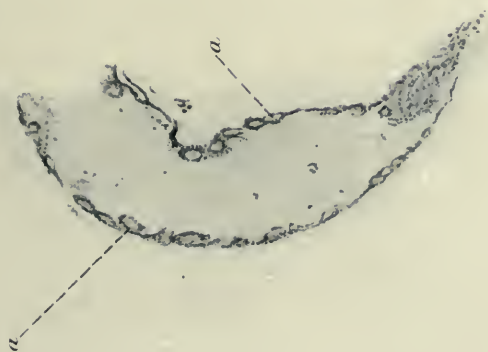


Fig. 5.





# ARCHIVES OF OPHTHALMOLOGY.

## KERATOCONUS WITH REPORTS OF CASES.<sup>1</sup>

By JOHN E. WEEKS, M.D., NEW YORK CITY.

(With one drawing in text.)

**K**ERATOCONUS is an affection of early adult life, seldom beginning before the age of fifteen years, and seldom after the age of thirty. It is said to affect women more frequently than men, but of the 15 cases reported here, 8 were men and 7 were women.

The cause of keratoconus is unknown. Bowman found keratoconus in several members of the same family, but similar observations have not been reported by others, and it is doubtful that heredity is a factor. Parisotti,<sup>2</sup> who made quite an extensive study of the subject, is of the opinion that it is due to a "diminished resistance of the central portion of the cornea, which renders it incapable of bearing the normal intraocular pressure. The cause is congenital, probably due to some defect in the structure of the central corneal tissue." He assumes that the elastic fibers are wanting. Lapersonne, in discussing Parisotti's paper, stated that he considered conical cornea to be a "congenital or acquired dystrophia, possibly from an affection of the sympathetic."

*Anatomic Findings:* Salzmann<sup>3</sup> examined a cornea with keratoconus microscopically. Thickness at the apex of the cone,  $\frac{1}{3}$  mm. Anterior epithelium and Bowman's membrane

<sup>1</sup> Read in part at the meeting of the American Ophthalmological Society, Washington, D. C., 1913.

<sup>2</sup> *Trans. Soc. française d'ophtal.*, 1909.

<sup>3</sup> *Centralbl. f. prakt. Augenheilk.*, March, 1906.

broken here and there, the gap being filled with scar tissue. This tissue was also present between Bowman's membrane and the epithelium. The deeper layers of the substantia propria were normal. Descemet's membrane was defective in places. Newolina examined a small portion of the apex of a cone. The opacities visible were found to be "due to thickening of the epithelium and to proliferations of connective tissue growing from gaps in Bowman's membrane." Uhthoff examined the eyes of an individual in whom keratoconus had recently developed. "Descemet's membrane was normal in one and ruptured in the other. The epithelium varied in thickness in the center of the cornea, but was normal at the periphery." He agrees with Axenfeld and others in the belief that the rupture of Descemet's membrane is the result, not the cause, of keratoconus. Erdman<sup>1</sup> examined keratoconus in an eye from a patient fifty-two years of age. There was marked thinning of the corneal tissue. Descemet's membrane was thickened in this case.

In regard to the opacities that appear at the apex in advanced cases, Collins and Mayou<sup>2</sup> state that many cases are due to a rupture in Descemet's membrane and its endothelium, through which aqueous humor filters into the cornea, causing it to become edematous.

In the beginning keratoconus is rather difficult to recognize. There are four principal objective methods for arriving at a diagnosis:

1. Observation with the ophthalmoscope, which will disclose a myopia at or near the center of the cornea, much greater than at the periphery of the cornea and a distortion of the retinal image, which distortion changes as the portion of the cornea through which the fundus is observed changes. Observed with the plane mirror, the apex of the cone, when the patient looks at the source of reflected light, gives a bright reflex surrounded by changing concentric shadows on slight movement.

2. The retinoscope, which gives the effect of irregular astigmatism, the reflex from the cornea being small at the apex of the cone, and elongated into an irregular wedge-

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<sup>1</sup> *Graefe's Arch.*, vol. xxvi, p. 88.

<sup>2</sup> "System of Ophth. Practice," Pyle, *Path. and Bact.*, p. 510.



shape at the sides of the cone, the base being toward the periphery of the cornea.

3. The keratoscopic examination, by means of Placido's disk, which is well illustrated in the plate by Perot<sup>1</sup> the image of the disk figure being elongated and broadened toward the periphery of the cornea.

4. The ophthalmometer. This is probably the most sensitive test for the detection of keratoconus in its very early stage, provided the mires are of suitable shape and size. The mires furnished with the instruments of Javal, having the black line running through the center in the direction of the axis of the arc, are well suited for the purpose. When keratoconus is observed in its very early stage even, it will be found that a meridian in which the central dividing lines of the mires when their images are brought into apposition fall in a straight line does not exist (Fig. 1). The cone is not a segment either of a sphere, an ellipsoid, or a parabola, but a mixture of all. The line of the image of the mires is broken at their intersection and frequently slightly curved. The deflection of the lines of the mires at either side of the middle is in the direction

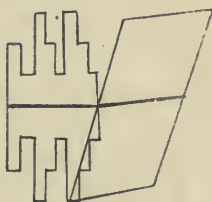


FIG. 1. Approximate distortion of image of Mires in Keratoconus.

of the torsion of the line of least curvature when the radius of that approximate meridian is measured, and in the direction of the line of most acute curvature when the radius of that approximate meridian is being measured, while the images of the mires are broadened in the direction of least curvature. If the image of the combined mires is sharp at their opposing margins, it will be blurred at the margins of the extremes of the image, the blurring being greatest in that portion of the image lying in the direction of the most acute curvature, because that portion will be most out of focus. The lines of the images are not irregular in the early stage, consequently cannot be confounded with the images of the mires seen in irregular astigmatism due to corneal ulcer or injury. Another point of differentiation

<sup>1</sup> Norris and Oliver's *System*, vol. iv., p. 250.

is the binocular character of keratoconus. The principal meridians in keratoconus are seldom at right angles, the difference ranging from 1 to 10 degrees. As a rule, the apex of the cone is reached by a more acute curve above than from below, due apparently to the supporting effect of the upper lid to the tissue of the cornea, but the meridian of greatest curvature is seldom directly vertical in its upper half; in fact, it may be found to be at least 45 degrees to either side, sometimes even lying nearer the horizontal meridian.

*Pulsation.*—Not infrequently, even in a comparatively early stage, pulsation of the apex of the cone may be observed by examination with the ophthalmometer. This is, of course, synchronous with the pulse. The variation in level seldom exceeds  $\frac{1}{6}$  mm. The pulsation is largely confined to the stage of progression. I have no record of having observed it in cases that have been stationary for a period of three years or more.

Another peculiarity is that the degree of astigmatism and the axes as determined by the ophthalmometer seldom correspond with those found by means of the trial-lenses.

The following are brief histories of cases observed not requiring operation: The readings from the ophthalmometer indicate axes of meridians of least curvature as nearly as could be ascertained.

CASE I.—Mr. H. C. F., aged eighteen years, came to my office February 22, 1895. Has grown rapidly—now 6 feet 2 inches tall; is slim, but apparently in good health. Vision has been failing during the last three years. Has attended school quite regularly, but has not used the eyes excessively.

*Status Præsens.*—Small crescent, possibly myopic, at temporal side of each disk. Fundus of each eye normal. Ocular muscles—exophoria, 4°; left hyperphoria, 3°. The distorted images of the mires were quite marked.

R. E.: Tn. Ophthalmometer 1.5 D.; axes not regular. V. with — 4.75 s.  $\odot$  — 1.5 c. ax.  $60^\circ = \frac{20}{60}$ .

L. E.: Tn. Ophthalmometer 0.5 D.; ax. not regular. V.; with — 0.75 s.  $\odot$  — 0.75 c. ax.  $130^\circ = \frac{20}{60}$ .

April 2, 1900; V. R. E. = 4.5 s.  $\odot$  — 2 c. ax.  $30^\circ = \frac{20}{60} +$ ;  
L. E. — 1.25 s.  $\odot$  — 1.12 c. ax.  $117^\circ = \frac{20}{60}$ .

March 19, 1905; V. R. E. — 4.25 s.  $\odot$  — 2.25 c. ax.  $30^\circ = \frac{20}{70}$ ; L. E. = 2.00 s.  $\odot$  — 2.75 ax.  $160^\circ = \frac{20}{40} +$ .

May 2, 1907; V. R. E. — 5 s. —  $\ominus$  2.5 c. ax.  $35^\circ = \frac{2}{7}\%$ ; L. E. — 1.5 s.  $\ominus$  — 4.5 c. ax.  $154^\circ = \frac{2}{4}\%$

April 14, 1912; V. R. E. — 4.5 s.  $\ominus$  — 2.5 c. ax.  $23^\circ = \frac{2}{10}\%$ ; L. E. — 1.5 s.  $\ominus$  4.5 c. ax.  $157^\circ = \frac{2}{6}\%$ .

In this case the vision in seventeen years fell from  $\frac{2}{7}\%$  to  $\frac{2}{10}\%$  in the right eye, and from  $\frac{2}{6}\%$  to  $\frac{2}{6}\%$  in the left, with marked increase in the astigmatism in both eyes, the peculiarity of the corneal images increasing in both eyes. The affection began at the age of fifteen years; the development in both eyes virtually ceased at the age of thirty years.

CASE 2.—Mr. S. M. B. came to my office March 16, 1895. The condition of refraction was: V. R. E. — 5 c. ax.  $75^\circ \ominus$  + 7 c. ax.  $158^\circ = \frac{2}{7}\%$  —; L. E. — 6 c. ax.  $132^\circ \ominus$  + 6 c. ax.  $38^\circ = \frac{2}{7}\%$  +. Tn. The characteristic images of the mires were observed on examination with the ophthalmometer. The patient has not been seen since.

CASE 3.—Mr. S. L. N., aged thirty-seven years, came to my office April 6, 1907, referred by Dr. Posey, of Philadelphia. Has had difficulty in the use of the eyes for six or seven years. Has not obtained relief from the use of glasses. Sees well if he makes a stenopaic slit of eyelids. Has quite severe dull pain back of eyeballs, accompanied by nausea on use of eyes. Six months ago the refraction was: V. R. E. + 1.25 c. ax.  $145^\circ = \frac{2}{4}\%$  +; L. E. + 0.50 s.  $\ominus$  + 0.50 c. ax.  $30^\circ = \frac{2}{6}\%$ .

*Status Præsens.*—The ophthalmometer measurements are: R. E. Astigmatism 3.25 D., lesser axis  $45^\circ$ ; L. E. 3.5 D., lesser axis  $153^\circ$ . Principal axes are not at right angles. The distortion of the images of the mires described above was very evident. R. E. — 2.5 c. ax.  $= \frac{2}{6}\%$ ; L. E. — 0.50 s.  $\ominus$  + 3 c. ax.  $25^\circ = \frac{2}{6}\%$ .

The optic disks in both eyes present an excavation of about 0.4 mm. Tn. in both eyes. Fields of vision not limited.

CASE 4.—Mr. H. Z., aged twenty-eight years, came to my office July 28, 1907. Vision began to be difficult five years ago. Patient is in good health. Has used the eyes excessively for close work. The affection probably began at about the age of twenty years.

*Status Præsens.*—Cornea clear. V., with correction, R. E.  $= \frac{1}{2}\%$ ; L. E.  $= \frac{1}{2}\%$ . Ophthalmometer: R. E. Astigmatism 8 D.; axis  $97^\circ$ ; L. E. 8 D.; axis  $80^\circ$ . The peculiar distortion of the images of the mires pronounced. V. R. E. — 1.5 s.  $\ominus$  + 8.75 c. ax.  $30^\circ = \frac{2}{6}\%$  —; L. E. — 0.50 s.  $\ominus$  + 8.25 c. ax.  $180^\circ = \frac{2}{7}\%$ . Fundi normal. Tn.

October 21, 1907, the vision and condition of the eyes were virtually unchanged.

CASE 5.—Mr. A. L. S., aged twenty-one years, came to my office November 22, 1907. Patient has noticed that his vision was imperfect for four or five years. Has never been robust, but has not had any severe illness. Has been studying hard for some years.

*Status Præsens*.—Cornea clear. No pathologic condition of the interior of the eyes. Ophthalmometer: R. E. = Astigmatism 4 D. ax.  $45^\circ$ ; L. E. 3.25 D. ax.  $130^\circ$ . Principal axes not at right angles. The peculiar distortion of the image of the mires is pronounced. V. R. E. + 3 c. ax.  $110^\circ = \frac{2}{100} +$ ; L. E. — 0.50 s.  $\odot$  + 3 c. ax.  $28^\circ = \frac{2}{30}$ .

April 7, 1909: V. R. E. + 3.5 c. ax.  $123^\circ = \frac{2}{100}$ ; L. E. — 0.50 s.  $\odot$  + 3 c. ax.  $28^\circ = \frac{2}{30}$ . Conical cornea very nearly stationary.

CASE 6.—Mrs. E. J. Van D., aged twenty-two years, came to my office February 17, 1908. Has had difficult vision for a number of years. Patient in rather feeble health.

*Status Præsens*.—Cornea clear. Fundi normal. Ophthalmometer: R. E. Astigmatism 2.25 D. ax.  $50^\circ$ ; L. E. = 8 D. ax.  $135^\circ$ . Principal axes not at right angles. Distortion of image of mires marked. Refraction: V. R. E. — 2 s.  $\odot$  2.25 c. ax.  $50^\circ = \frac{2}{40} -$ ; L. E. — 3 s.  $\odot$  — 6 c. ax.  $132^\circ = \frac{2}{20} -$ . Tn. The change taking place in the cornea is slight.

CASE 7.—Miss E. T. D., aged sixteen years, came to my office October 17, 1908. The difficulty with vision began at the age of ten years. Patient pale, somewhat anæmic.

*Status Præsens*.—Ophthalmometer: R. E. Astigmatism 6.5 D. ax.  $28^\circ$ ; L. E. 6 D. ax.  $145^\circ$ . Refraction: V. R. E. + 0.25 s.  $\odot$  — 5.5 c. ax.  $20^\circ = \frac{2}{50} +$ ; L. E. + 0.50 s.  $\odot$  — 5 c. ax.  $173^\circ = \frac{2}{40}$ . The patient was a school-girl. She was permitted to use the eyes for reading two hours daily at divided intervals.

April 29, 1910: V. R. E. + 1.5 s.  $\odot$  — 6 c. ax.  $40^\circ = \frac{2}{30} -$ ; L. E. + 0.75 s.  $\odot$  — 6.5 c. ax.  $107^\circ = \frac{2}{50} +$ . Patient has been ill. Has used the eyes a great deal.

May 5, 1911.: The refraction is virtually the same as in April, 1910. V., with correction, R. E. =  $\frac{2}{30}$ ; L. E. =  $\frac{2}{100}$ . The fundi oculorum are normal. The peculiar distortion of the images of the mires is pronounced. Principal axes of the astigmatic error not at right angles.



CASE 8.—Dr. George S. K., aged thirty-four years, came to my office March 25, 1913. Vision was very good until the patient was fourteen years of age, when he was severely ill with typhoid fever. Shortly after his recovery the vision began to be difficult. The change in the cornea apparently began at the age of fifteen years.

*Status Præsens*.—Patient in robust health. Cornea clear. Fundi normal. Tn. V. R. E. =  $\frac{2}{20}$ ; L. E. =  $\frac{1}{20}$ . Ophthalmometer: R. E. Astigmatism 5.75 D. ax. 55°; L. E. 4.75 D. ax. 145°. Principal meridians not at right angles in either eye. Peculiar distortion of images of mires pronounced. Refraction: V. R. E. — 1 s.  $\bigcirc$  — 9 c. ax. 23° =  $\frac{2}{60}$  +; L. E. — 1 s.  $\bigcirc$  — 9 c. ax. 153° =  $\frac{2}{100}$ . Patient thinks that the process has been virtually stationary for some years.

CASE 9 —Mrs. H. T. D., aged thirty-eight years, came to my office April 4, 1913. Patient in fairly good health. Has never used the eyes to excess for reading or other close work.

*Status Præsens*.—Ophthalmometer: R. E. Astigmatism 4.5 D. ax. 55°; L. E. 2.87 D. ax. 130°. The principal axes were not at right angles. The peculiar distortion of the images of the mires was present. Refraction: V. R. E. = — 1.5 s.  $\bigcirc$  — 0.5 c. ax. 85° =  $\frac{2}{30}$  +; L. E. — 0.50 s.  $\bigcirc$  — 2.5 c. ax. 103° =  $\frac{2}{60}$  —. Inability to use the eyes with comfort began five years ago.

May 2, 1913: Condition virtually the same. The patient is now using the eyes with comparative comfort.

Treatment of conical cornea may be divided into the non-operative and operative measures; the non-operative into systematic and local. Bradfield<sup>1</sup> thinks that the treatment should begin by correcting errors in the general health. The author is of the opinion that attention to the health is of value in the early stage of the development of keratoconus, and that the patient should be carefully directed regarding the use of the eyes. Locally the instillation of pilocarpin and the application of a light compress bandage at night may be of value, but the treatment must be long continued, extending over six to eight months, at least, to produce any beneficial results. Suitable glasses in the early stage not only improve vision but apparently aid in retarding and limiting the progress of the affection. (See Cases 4 and

<sup>1</sup> *Amer. Jour. Ophth.*, Oct., 1903.

5.) The discussion of special optical measures is purposely omitted.

The operative procedures resorted to have been many. Von Graefe's method was to produce an ulcer at the apex of the cone by removing a small piece of corneal tissue without perforating the cornea. After twenty-four to forty-eight hours the exposed area was treated with the mitigated stick of nitrate of silver, the cauterization being repeated every third day for two or three weeks. Paracentesis through the floor of the cornea was performed and repeated every second day for a week, when healing was permitted to take its course. A compress bandage was employed throughout and subsequently; when the contraction and flattening were complete, a narrow optical iridectomy was performed.

Bader's method consists in removing a small elliptic flap of the cornea at the apex of the cone and bringing the margins together by one or two fine sutures. Some operators place the ellipse vertically, others horizontally. Anterior synechiæ occur in a number of the cases. Optical iridectomy is required.

Mr. Morton's operation<sup>1</sup> is a modification of Bader's operation.

Sir William Bowman's method consisted in removing a disk from the apex of the cornea with a small trephine. Cicatrization of the wound proceeds under a compress bandage, producing the desired flattening.

Multiple puncture of the cone at its apex, using a fine cataract needle, has been employed. The apex of the cone is punctured four to six times at one sitting, repeating it at intervals of two to three weeks. The pupil is kept contracted by the use of eserine and a compress bandage used throughout. "Eventually a network of connective tissue forms which flattens the cone without producing much corneal opacity."

A procedure largely practised is the application of the electrocautery or thermocautery. The cautery is applied in various ways. Sir A. Critchett "first applies the cautery at a black heat to the entire area to be cauterized. Within this area a little more tissue is destroyed by an increased

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<sup>1</sup> *Brit. Med. Jour.*, 1880, p. 623.

heat, while the very apex is touched with a cautery at a dull red heat. One sitting is sufficient" (Swanzy). Gayet<sup>1</sup> carried the cauterization to perforation at the apex. Knapp<sup>2</sup> always endeavored to make the perforation as small as possible. He was of the opinion that perforation was essential to success. A modification of the ordinary application of the cautery is advocated by Elschmig.<sup>3</sup> He endeavors to induce vascularization of the cauterized area, believing that it produces a firmer cicatrix. In order to encourage vascularization he connects the central cauterized area by a rather broad cauterized strip to the limbus in a portion of the cornea that will not interfere with the pupillary area. He does not perforate, nor does he think that iridectomy is necessary or desirable. Tattooing of the cicatrix is resorted to in some cases. In order to avoid a dense scar at the center of the cornea Dodd<sup>4</sup> employs the galvanocautery, making a series of cauterized points about 1 mm apart in the form of a horseshoe, about the apex of the cone, the uncauterized base of the shoe being upward, leaving the pupillary area free. The cauterization can be repeated if necessary. Grossmann<sup>5</sup> advocates cauterizing the cone with superheated air, employing a special apparatus for the purpose.

Angelucci<sup>6</sup> introduced a purse-string suture around the apex of the cone, the suture passing in the substantia propria between Bowman's and Descemet's membranes. The apex of the cornea was cauterized and a portion excised by means of a Graefe knife. The suture was removed in eight days. Vision was improved.

In the study of keratoconus it occurred to the writer that in order to bring about suitable permanent reduction of the cone by operative procedure it was necessary to reduce the tension of the eye as much as possible and to maintain the hypotony for a long period of time; that is, until the healing was complete and the cicatrices firm. To this end it was thought advisable to perform iridectomy, placing the coloboma where

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<sup>1</sup> *Lyon médicale*, xxx., 1879, also Tweedy and Knapp.

<sup>2</sup> Norris and Oliver's *System*, vol. iii., p. 825.

<sup>3</sup> *Wiener klin. Rundsch.*, 1904, 20.

<sup>4</sup> *Med. Press and Circular*, February, 1903.

<sup>5</sup> *Brit. Med Jour.*, Aug. 26, 1905.

<sup>6</sup> *Bull. de la Soc. Belge d'Oph.*, No. 29, p. 56, 1910.

it would ultimately be of greatest aid to vision because of its well-known tendency to reduce intraocular tension, and, at the end of one or two weeks, to apply the chosen procedure to the apex of the cornea, following this by the use of pilocarpin and a compress bandage. In the five operated cases reported this plan of procedure was followed. An iridectomy back of clear cornea, upward, upward and inward, or upward and outward, was performed. Ten days later the apex of the cone was cauterized, the cauterized area being oval, its long axis horizontal, and seldom extending above the horizontal meridian of the cornea. Cauterization was performed with a platinum point heated to a red heat in the flame of a spirit-lamp. The eschar was carried as deep as possible at the apex without perforating the cornea. The subsequent treatment consisted in the use of borated vaselin, pilocarpin, and a compress bandage, the bandage being applied continuously for three weeks and at night for two months.

The following are the reports of cases treated as described above:

CASE 1.—Mr. J. S. B., aged twenty-seven years, consulted me at my office May 26, 1895. In 1890 patient was an excellent shot. Was a stenographer in government employ at Washington, worked arduously during the day and attended night school, used the eyes day and night. First noticed failure of vision in the spring of 1891. Up to the spring of 1893 patient had consulted four quite well-known ophthalmologists, all of whom failed to make a diagnosis. Had many changes of glasses. Was treated by internal medication, electricity locally, etc. Consulted the late Dr. Bell, of Washington, in the spring of 1893, who made a diagnosis of keratoconus. Saw the late Dr. H. Knapp early in the year 1895, who gave glasses, but advised against operative procedure.

When examined by me, the ophthalmometer gave the peculiar images of the mires always observed in keratoconus. R. E. = Astigmatism 7.5 D. ax.  $10^{\circ}$ ; L. E. = Astigmatism 10 D. ax.  $160^{\circ}$ . The left cornea pulsated, the difference in the refraction at the apex of the cone being 1.25 D. between diastole and systole. V., without correction, R. E. =  $\frac{2}{200}$ ; L. E. =  $\frac{1}{400}$ . With correction, R. E. = + 1. s  $\subset$  — 7. c. ax.  $85^{\circ}$  =  $\frac{2}{40}$  —; L. E., with best glass possible, =  $\frac{2}{200}$ . With correction and stenopaic slit V. R. E. =  $\frac{2}{30}$  —; L. E. =  $\frac{2}{200}$ .



In June, 1899, I performed iridectomy on the left eye and later cauterized the apex of the cone. On November 6, 1900, V. R. E. = + 1.5 s.  $\odot$  — 7 c. ax.  $85^\circ$  —  $\frac{2.0}{2.0}$  +; L. E. = — 2 s.  $\odot$  — 2 c. ax.  $140^\circ$  —  $\frac{2.0}{2.0}$  +. On November 19, 1908, (when last seen) V. R. E. = + 2.5 s.  $\odot$  — 6 c. ax.  $86^\circ$  =  $\frac{2.0}{3.0}$  —; L. E. = — 2 s.  $\odot$  — 2 c. ax.  $140^\circ$  =  $\frac{2.0}{2.0}$ .

It is interesting to note the change in the corneæ as indicated by the Javal measurements. While the June reading gave 7.5 D. ax.  $10^\circ$  in the right eye at the first measurement, it was found that the best visual results were obtained with the axis of the cylinder at  $85^\circ$ . In September, 1896, the Javal gave astigmatism 6 D. ax.  $90^\circ$ ; November 19, 1908, 6 D. axis  $87^\circ$ . The left eye by Javal gave astigmatism 10 D. ax.  $10^\circ$  before operation, 0.5 D. ax.  $20^\circ$  shortly after operation, and, at the last measurement, November 19, 1908, 1.5 D. ax.  $105^\circ$ .

In this case the condition of the right eye was virtually stationary when the patient was first seen by me. The refraction has changed from hyperopia 1 D. in the meridian of least curvature to hyperopia 2.5 D. Since the operation the astigmatism of the left eye has changed from 0.5 D. ax.  $20^\circ$  to 1.5 D. ax.  $105^\circ$ . Both eyes have been stationary during the last two or three years.

CASE 2.—Miss M. F. C., age fifty-four years, came to my office December 31, 1911. Has never suffered any severe illness. Is now in good health. Began to have trouble with vision at about the age of nineteen years. Difficulty increased to the age of thirty-five years since which time there has been but little change. Ten years ago was operated on the left eye by Pagenstecher at Wiesbaden, who did an iridectomy to the temporal side, cauterized the apex of the cone, and tattooed the scar.

*Status Præsens.*—Right eye: Pronounced conical cornea. Three small white spots at the apex of the cone, also some haziness of the cornea involving the cone and extending almost to the periphery below. V. =  $\frac{2.0}{2.0}$ ; improved to  $\frac{2.0}{2.0}$  with a midriatic; not materially increased by the use of glasses or pin-hole diaphragm. Javal unsatisfactory. Fundus normal. Tn. No pulsation of apex of cone.

Left eye: Cornea conical. Tattooed at apex. Coloboma outward. Cornea hazy except in upper third V. =  $\frac{2.0}{2.0}$  improved to —  $\frac{2.0}{2.0}$  with glasses. Fundus normal. Tn. Reads ordinary type with difficulty by holding the page close to the face.

In the belief that, by reducing the acuity of curvature of the cornea, and by placing the pupil opposite the clearest portion of the cornea, better vision could be obtained, I

advised an iridectomy and a subsequent cauterizing of the apex of the cone.

October 10, 1912, iridectomy right eye upward. Operation smooth. Healing uneventful. December 20, 1912, V. =  $\frac{8}{200}$ . January 2, 1913, cauterized the apex of the cone. Dressings daily, introducing borated vaselin (3 per cent.) into the right eye and afterward applying a light compress bandage. This was continued three weeks. February 12, 1913, V. R. E., with—6 s. =  $\frac{20}{100}$ . Curvature of cornea much reduced. Tn. —. February 18, 1913, epithelium over area of cauterization vesicular. Condition similar to recurrent erosion keratitis. March 4, 1913, as the corneal epithelium at the apex of right eye did not become firmly adherent, patient was referred to the Infirmary, the cauterized area, thoroughly curetted, borated vaseline introduced, and the eye bandaged. The epithelium readily re-formed, but ten days later again became detached. Hot bathing, *i. i. d.* one hour at a time, was advised. March 27, 1913, eye smooth. Curvature of cornea greatly reduced in acuity. April 9, 1913, V. R. E., with glasses =  $\frac{20}{200}$  +. Reads Jaeger 5 fairly readily. The vision appears to be gradually improving.

CASE 3.—Mrs. P. L. B., aged thirty-seven years, came to my office October 16, 1906. Patient of medium height, apparently in good health. Vision began to fail at the age of twenty-three years, and has failed rapidly during the last three years. Does not use the eyes excessively for close work. Diagnosis: Conical cornea. With the exception of the corneæ the eyes are normal. Tn.

*Status Præsens.*—Right eye, ophthalmometer 1.5 ax.  $5^{\circ}$ . Curvature of cornea not regular in any meridian. The approximately principal meridians not at right angles. V. with—1 s.  $\bigcirc$  + 5 c. ax.  $5^{\circ}$  =  $\frac{20}{200}$  +. Tn. No pulsation.

Left eye. Ophthalmometer 3 D. ax.  $90^{\circ}$ . Curvature of cornea not regular in any meridian. Principal meridians not at right angles. V. with + 4.5 s.  $\bigcirc$  — 9.5 c. ax.  $105^{\circ}$  =  $\frac{20}{100}$  +. Cone pulsates, the movement of the apex being about 1 $\frac{1}{2}$  mm. Two very small grayish spots at the apex of the cone.

October 10, 1910, V. R. E. = — 2 s.  $\bigcirc$  + 6 c. ax.  $177^{\circ}$  =  $\frac{20}{40}$  +; L. E., with correction as above =  $\frac{15}{200}$ .

January 14, 1913, V. R. E. = — 1.5 s. +  $\bigcirc$  6 c. ax.  $177^{\circ}$  =  $\frac{20}{40}$ . Although the astigmatism during the six and one-third years of observation had slightly increased in this eye, the vision with correction had slightly increased and the eye appears to be now at a standstill so far as the keratoconus is concerned. Left eye: V., with correction, =  $\frac{20}{200}$  —.

During the same period of observation the vision had fallen from  $\frac{20}{200} +$  to counting fingers at two feet. The apex of the cone was below the horizontal meridian of the cornea. The opacities at the apex had coalesced and enlarged. Operative procedure was advised for the left eye, and an iridectomy upward was performed January 14, 1913. Ten days later the apex of the cone was cauterized. April 22, 1913, V. = — 2 s.  $\odot$  — 3 c. ax.  $60^\circ = \frac{15}{200}$ . Patient complains of some photophobia. Eye quiet.

CASE 4.—Miss Margaret V., aged twenty-five years, referred to me by Dr. Dobson, of Poughkeepsie, December 6, 1912. Height about 5 feet 11 inches. Attained present stature at about the age of sixteen years. Grew rapidly. Has lived in the country, much out-of-doors. No history of excessive close use of eyes. Is now strong and robust. Noticed beginning of impairment of vision at age of sixteen years. Vision has grown decidedly worse during the last three years.

*Status Præsens*.—Right eye: Pronounced keratoconus apex slightly below the center of the cornea, transparent. Javal 14 D. of astigmatism, axis approximately  $180^\circ$ . Eye normal except the corneal condition. Tn. V. =  $\frac{20}{200}$ , with pin-hole diaphragm =  $\frac{20}{200}$  —, with — 9 ax.  $180^\circ = \frac{20}{200}$  —.

Left eye. Pronounced keratoconus. Apex of cone below the horizontal meridian. Small opacity at apex. Slight haziness of cornea about apex and slightly below. Pulsation causing bulging of cornea about  $\frac{1}{8}$  mm at each systole. Eye normal except for the corneal condition. V. with pinhole =  $\frac{18}{200}$ , not improved with glasses. Tn. —.

On January 9, 1913, the patient was admitted to the New York Eye and Ear Infirmary, and an iridectomy was performed on the left eye. Healing uneventful. January 21st, apex of cone cauterized. Eye kept under a light compress bandage three weeks and bandaged at night three weeks longer. Recovery uneventful.

February 13th, iridectomy upward performed on the right eye. Healing uneventful. Apex of cone cauterized February 22d. The eye was kept under a light compress bandage three weeks and bandaged at night three weeks longer. Recovery uneventful.

March 25, 1913, tension of both eyes slightly minus. Condition excellent. V. R. E. = + 3 s.  $\odot$  — 10 c. ax.  $13^\circ = \frac{20}{100}$ ; L. E. = + 1 s.  $\odot$  — 10 c. ax.  $170^\circ = \frac{20}{100} +$ . Reads Jaeger 2 with facility.

Advised the use of pilocarpin muriate 0.75 per cent., once daily for the purpose of keeping the tension low until the cicatrix becomes firm. Compress bandage at night.

CASE 5.—Victor B., aged thirty-seven years, came to my clinic at the New York Eye and Ear Infirmary on March 25, 1913. Has always been near-sighted. Vision began to fail eight years ago. Has always read much at night as well as in the daytime. Has always been well. In August, 1906, the apex of the conical cornea of the right eye was cauterized by an ophthalmic surgeon.

*Status Præsens.*—Pronounced keratoconus in both eyes. Vision  $\frac{5}{200}$  each, improved but little with glasses. Apices of cones slightly below the horizontal meridian of the cornea. Very slight pulsation. There was a long, narrow, irregular opacity at the apex of the cone of the right eye, not very dense, probably largely due to the cauterization, a minute opacity at the apex of the cone of the left eye. March 27th, iridectomy upward, left eye. April 6th, cauterized the apex of the cornea, left eye. May 3d, V. L. E., without correction =  $\frac{18}{200}$ ; with correction =  $\frac{20}{100}$  +.

An analysis of the foregoing cases goes to show that when the vision in keratoconus has fallen to  $\frac{8}{200}$  or less, it may be improved very much by the operative procedure described. In Case 1, which has been under observation fourteen years since the operation, the cornea has remained unchanged. That complications may arise is evident from Case 2. The recurrent detachment of the epithelium from the cauterized area was apparently due to reduced vitality in an individual of advanced years. The inference from the observation of the behavior of the corneal epithelium in the other cases is that, in young individuals, the complication will probably not occur because of a more vigorous state of vitality of the corneal tissue.

Photophobia is complained of by some patients, but this annoying symptom appears to be very transient.

In regard to other operative procedures, it occurs to the writer that large central perforations, either by trephining or by cauterizing, may lead to fistulæ occasioning no little annoyance in their closure. Meller cautions against using a trephine more than 1 mm in diameter.



# THE EXPERIMENTAL PRODUCTION OF SCLERO-KERATITIS AND CHRONIC INTRAOCULAR TUBERCULOSIS.<sup>1</sup>

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(With eight figures on Text-Plate IX.)

THREE years ago I brought forward the theory that in tuberculous scleritis and keratitis the infection reached the sclera and cornea by way of the aqueous humor and ligamentum pectinatum.<sup>2</sup> The bacilli, it was assumed, passed into the aqueous humor either directly from the capillaries of the ciliary body or from small metastatic foci situated just beneath the pars ciliaris retinæ. The theory was deduced chiefly from the histologic findings in an eye with typical tuberculous sclero-keratitis in which both old and recent lesions were present. Since then I have had opportunity to examine histologically several additional cases that have given confirmation to the theory, and still more recently I have succeeded in obtaining experimental evidence which not only strongly supports this theory, but which goes to prove that chronic intraocular tuberculosis has, in general, a similar origin. It is this experimental evidence that forms the basis of the present communication.

In 1907 Stock<sup>3</sup> published the results of an investigation in

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<sup>1</sup> Read before the American Ophthalmological Society, Washington, May 7, 1913.

<sup>2</sup> "The histologic findings in a case of tuberculous cyclitis, and a theory as to the origin of tuberculous scleritis and keratitis." *Trans. Amer. Ophth. Soc.*, 1910.

<sup>3</sup> "Tuberkulose als Aetiologie der chronischen Entzündungen des Auges

which he had injected living tubercle bacilli into the earveins of rabbits. He found almost constantly focal lesions throughout the uvea, the most notable feature of which was their tendency to heal without destroying the eye. These results have led Stock and others to attach great importance to tuberculosis as a cause of chronic uveitis in man. I have come to believe, however, that Stock's experiments were conducted under conditions so different from those obtaining in human cases of chronic ocular tuberculosis that they are of little significance in regard to the latter. In his experiments large numbers of virulent bacilli were suddenly introduced into the blood of animals presumably free from tuberculosis. In human ocular tuberculosis of the chronic type, on the other hand, the patient has previously been affected with tuberculosis, usually glandular in character, and has acquired a relative immunity which must necessarily influence the eye lesions. The importance of this difference is shown by clinical experience, for according to Stock's results the most common type of ocular tuberculosis should be uveitis, while sclero-keratitis should be exceptional, whereas in reality the latter is common while tuberculous iritis and choroiditis are relatively extremely rare. Moreover, the ciliary body was seldom affected in Stock's experiments, and when it was the lesions did not involve the inner surface of the ciliary processes, thus differing greatly from the lesions of chronic tuberculous cyclitis in man.

In only two of his animals did Stock find active scleritis. In one of these there was an extensive involvement of the sclera in the equatorial region clearly due to direct extension from the choroid. Clinically the appearance produced was not unlike that of brawny scleritis in man, and Stock, therefore, inferred that the latter condition may result from tuberculosis. In his discussion Stock does not clearly distinguish between brawny scleritis and anterior nodular scleritis. In a recent paper<sup>1</sup> I have shown that these two conditions, both clinically and histologically, are entirely different; that, moreover, brawny scleritis begins in the sclera and only

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und seiner Adnexe, besonders der chronischen Uveitis." *Graefe's Arch. f. Ophthalmologie.*, 1907, lxvi., p. 1.

<sup>1</sup> "Brawny scleritis." *The Ophthalmoscope*, Jan., 1913, p. 1.

ILLUSTRATING DR. VERHOEFF'S ARTICLE ON "THE EXPERIMENTAL PRODUCTION OF SCLERO-KERATITIS AND CHRONIC INTRAOCULAR TUBERCULOSIS."

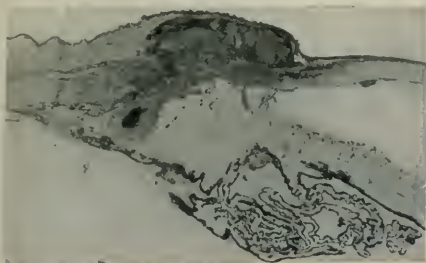


FIG. 1.

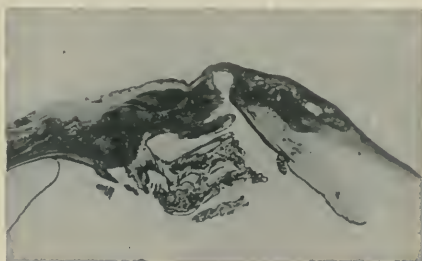


FIG. 2.

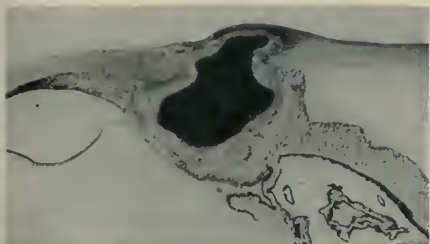


FIG. 3.



FIG. 4.

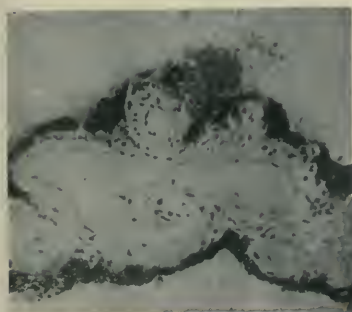


FIG. 5.

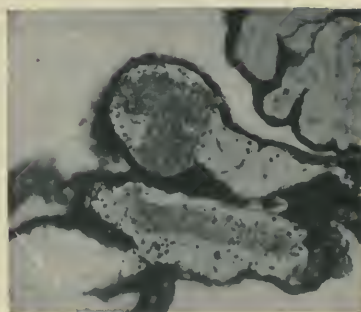


FIG. 6.

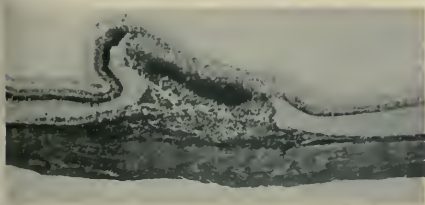


FIG. 7.

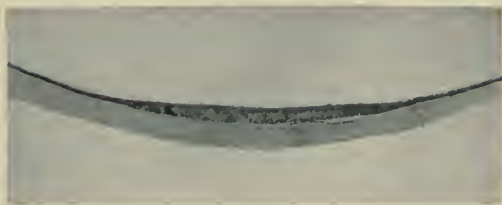


FIG. 8.

FIG. 1. (Experiment 2.) Sclero-keratitis due to dead tubercle bacilli introduced into vitreous of rabbit. Note also minute tubercle on membrane of Descemet.

FIG. 2. (Experiment 5.) Sclero-keratitis due to dead tubercle bacilli introduced into anterior chamber of immunized rabbit. Note also intercalary staphyloma and small tubercle of iris.

FIG. 3. (Experiment 2.) Caseating tubercle involving ciliary body and sclera, due to dead tubercle bacilli introduced into vitreous of rabbit.

FIG. 4. (Experiment 3.) Caseating episcleral tubercle and large tubercle of ciliary body due to dead bacilli introduced into anterior chamber.

FIG. 5. (Experiment 5.) Small tubercle making its way through epithelium of ciliary body from without.

FIG. 6. (Experiment 5.) Small tubercle entirely within ciliary process. This evidently originated outside the process as indicated in Fig. 5.

FIG. 7. (Experiment 2.) Caseating tubercle of retina due to clumps of dead tubercle bacilli which have passively entered the retina from the vitreous.

FIG. 8. (Experiment 3.) Tubercle of choroid due to dead tubercle bacilli introduced into anterior chamber which have passed along the sub-chorioid space.





secondarily affects the uvea, and that in all probability it is due to syphilis. In the other animal Stock obtained a large caseating focus involving the corneo-scleral junction and producing the clinical picture of sclerosing keratitis, which he assumed originally had extended by continuity from the anterior part of the choroid.

As I have previously pointed out, histologic examinations in human cases show that tuberculous scleritis does not arise by continuity from the uvea, as assumed by Stock. The possibility of direct metastases from the blood can also be excluded by the facts that metastases to the sclera rarely if ever occur in cases of malignant tumors, pyemia, miliary and other active forms of tuberculosis. Moreover, in case of the choroid such metastases are relatively common, so that if nodular scleritis was due to blood metastases, chronic tuberculous choroiditis should be far more frequent than tuberculous scleritis, whereas the reverse is true. This argument is strengthened by Stock's large series of experiments just referred to, in which the choroid almost invariably showed metastatic foci, while the sclera was affected in no more than three animals and here apparently not by direct blood metastases. Extension from the uvea and direct metastasis from the blood thus being excluded, the only remaining possibility would seem to be that anterior nodular scleritis in man is due to metastases through the filtration angle from the aqueous humor, and this origin I have shown to be clearly indicated by the histologic findings in enucleated eyes.

In endeavoring to test experimentally this theory, it obviously would not be practical to attempt to reproduce all the conditions occurring in human cases. For, granting the possibility of producing a systemic chronic tuberculosis similar to that in man, the percentage of animals that could be expected to develop scleritis would be far too small. On the other hand, the attempt to produce tuberculous scleritis by introducing live virulent bacilli into the vitreous chamber would also be impractical, because an active intraocular tuberculosis would ensue before scleritis could develop. In human cases it is clear that, since the lesions are of a mild type and ultimately always heal, the bacilli must be relatively inactive. It occurred to me, therefore, that for experimental

purposes dead bacilli might serve, and as will be seen, this has proved to be the case.

In the following experiments bacilli from a three-weeks'-old culture of virulent human tubercle bacilli on glycerin agar were used. They were killed by exposure to ultra-violet light, although the same results no doubt could be obtained with bacilli killed by heat. Two loopfuls of bacilli were stirred into 2cc. of distilled water, and then exposed for ten minutes to the light of a Cooper-Hewitt quartz mercury vapor lamp (220 volts, 3.5 amperes) without the globe, at a distance of 20cm. This suspension was drawn up through a fine needle into a hypodermic syringe, and a few drops then injected through the sclera or into the anterior chamber as desired. Thus no attempt was made accurately to adjust the dosage. In three eyes no lesions resulted, due possibly to large clumps of bacilli lodging in the needle and preventing a sufficient number of bacilli entering the eyes.

EXPERIMENT I.—Injection of dead tubercle bacilli into vitreous humor of left eye of rabbit.

After seven weeks a minute spot is seen on the surface of the iris. There are no scleral nodules, and the eye is free from congestion. Enucleation.

*Macroscopic Examination.*—In addition to the spot on the iris, an elevated spot beneath the retina corresponding to the puncture wound, and a tubercle in the fundus, 1mm in diameter, are seen.

*Microscopic Examination.*—The iris shows a few small tubercles on its surface and within the stroma, besides the large one seen macroscopically. The relative scarcity of lesions in this eye is evidently due to injection of fewer bacilli than in subsequent experiments. Numerous tubercles are found in the ligamentum pectinatum. These are too small to involve the sclera to any extent, but some of them extend into the subchoroidal space. They occur above as well as below, but are largest below. They, as well as the iris tubercles, consist of endothelial cells with occasional giant-cells, but show no caseation. They contain from one bacillus in three fields to three bacilli in one field. The surface of the ciliary body is almost free from tubercles, but a few minute tubercles are seen on the orbiculus ciliaris, one of which has destroyed the epithelium. One small tubercle is found free in the anterior part of the vitreous, made up of endothelial cells free from necrosis. Two others, each about .2mm in size, are seen in the pos-

terior part of the vitreous near the retina. The latter are almost completely necrotic, and surrounded apparently by young connective-tissue cells.

At the site of the puncture wound there is a tubercle without caseation which involves chiefly the choroid. The tubercle of the retina in the fundus involves mainly the outer retinal layers, destroying the pigment epithelium and the inner layers of the choroid, and leaving the inner layers of the retina intact. It is free from caseation. The surrounding choroid is infiltrated with plasma and lymphoid cells. The tubercle contains only a few bacilli. At the equator below there are two small tubercles on the surface of the retina, and the latter in this region is giving off a considerable exudate of pus cells.

In juxtaposition to the optic disk the choroid shows a large tubercle, over which the pigment epithelium and retina are intact. This was probably due to metastasis from the large retinal tubercle a short distance away from it. A few minute choroidal tubercles are also seen elsewhere in the fundus.

EXPERIMENT II.—Injection of dead tubercle bacilli into vitreous humor of rabbit's eye (Figures 1, 3, and 7).

Eleven weeks later the eye is still perfectly free from congestion, but the iris shows numerous small white spots, irregular in shape, the largest being .75mm in diameter. The cornea is clear. At the limbus on the outer side there are three elevated nodules, and on the inner side there are also three. The largest is 2.5mm in diameter, and extends .25mm into the cornea. The others are each about .75mm in diameter, and situated .25mm from clear cornea. Directly below there is a single nodule 2.5mm in diameter, which is more elevated than any of the others. It has an opaque center with translucent periphery. Enucleation.

*Macroscopic Examination.*—The inner surface of the ciliary body shows 14 irregular shaped white spots, not elevated, the largest 2mm in diameter, situated just behind the ciliary processes. The retina and choroid are *in situ*, and show in the lower quadrant 14 elevated round spots with opaque centers, and a single similar spot in the upper outer quadrant. The vitreous humor is clear.

*Microscopic Examination.*—Only a few small tubercles happen to be encountered in the iris. These are usually near the anterior surface at the pupillary margin or near the root. None is seen on the posterior surface. The white spots seen on the inner surface of the ciliary body macroscopically are found to be tubercles in the filtration angle showing through. The smallest tubercles are centered in



the ligamentum pectinatum; some of the largest ones sometimes involve chiefly the sclera and cornea, others also the ciliary body. Most of them show caseous centers containing about two bacilli in a field. No clumps of bacilli are seen here. Extending out from the large tubercle below, the cornea is infiltrated and vascularized for a considerable distance, but only superficially. On the posterior surface of the cornea here and there occur small nodules of endothelial cells.

Several small tubercles are seen in the vitreous humor in the vicinity of the ora serrata. These are made up of branching cells and are surrounded by capsules of young connective tissue. Some are slightly infiltrated with pus cells, but they show no caseation.

The elevated spots in the fundus are found to be tubercles situated between the choroid and retina and involving both of these structures (Figure 7). The rods and cones, and to a less extent the nuclear layers, are replaced by a caseous mass containing necrotic pigment cells and pigment granules. Behind this the pigment epithelium is destroyed, and from the inner layers of the choroid an exudation of endothelial cells is taking place. Deeper down and at the periphery of the tubercle the choroid is richly infiltrated with plasma cells. Within the caseous mass fairly numerous tubercle bacilli occur, usually singly, rarely in small groups. Tubercle bacilli are also found free in the intact retina over the tubercle.

EXPERIMENT III.—Injection of dead tubercle bacilli into anterior chamber of rabbit's eye (Figures 4 and 8).

After twelve weeks the eye shows slight pericorneal injection and the pupil is somewhat contracted. There are numerous tubercles on the iris, and two scleral tubercles near the limbus below, 5mm apart. Each of the latter is about 1mm in diameter externally. Enucleation.

*Macroscopic Examination.*—In the choroid a single white spot, not appreciably elevated, is found 1mm below the medullated streak and 8mm from the disk. There are no tubercles of the retina.

*Microscopic Examination.*—A large tubercle almost completely caseous is found replacing the ciliary body and root of iris below. It contains numerous bacilli, some of them in large clumps. In front of this, but not in direct continuity with it, there is a smaller tubercle in the episcleral tissue, corresponding to one of the tubercles seen before enucleation (Figure 4). This also has a caseous center and contains numerous discrete bacilli but no clumps. The cornea in this region shows a marked infiltration and is richly vascu-



larized. The infiltration reaches almost to the pupillary area. There are no foci of epithelioid cells in the cornea, the reaction evidently being due to toxins diffused from the tubercle in the ciliary body. On the posterior surface of the cornea there are nodules of endothelial cells. The filtration angle shows smaller tubercles elsewhere, but none above.

The iris shows numerous minute tubercles, most of them on its surface but some also within its stroma.

A few minute tubercles are found below, on and within the ciliary processes, as in experiment V. These are no doubt due to bacilli which were carried into the aqueous humor from the large tubercle of the ciliary body and deposited on the ciliary processes.

The choroid below shows a few discrete foci of endothelial cells leading away from the filtration angle. The white spot in the choroid seen macroscopically is found to be a flat tubercle 2mm in diameter (Figure 8). It does not involve the retina, and consists of epithelioid cells in the deepest layers of the choroid with lymphoid cell infiltration of the chorio-capillaris. This tubercle contains very few bacilli, no more than one being found in any section examined.

EXPERIMENT IV.—Injection of dead tubercle bacilli into vitreous humor of left eye of rabbit which had healed tuberculosis of right eye. The right eye had been inoculated with the bacillus of lupus two years previously and was in a state of phthisis bulbi free from inflammation.

Within one week the left eye showed a severe inflammatory reaction, with iritis. This rapidly subsided. Enucleation at end of five weeks.

*Microscopic Examination.*—The anterior part of the vitreous humor is solidly infiltrated with necrotic pus cells which show a nodular arrangement around clumps of tubercle bacilli. Posteriorly the vitreous is infiltrated chiefly with serum. The retina is separated almost everywhere, and is giving rise to a marked exudation of pus cells but no endothelial cells. From the ciliary body, granulation tissue is making its way into the infiltrated vitreous. Upon and beneath the surfaces of the ciliary processes, minute foci of endothelial cells are sometimes seen, similar to those in Experiment V. The pupil is occluded by membrane. The iris shows a few tubercles on its surface and within the stroma. The filtration angle shows numerous tubercles which are usually closed off by adhesions of the root of the iris to the cornea. These are largest below. The cornea for a considerable distance from the limbus both above

and below is vascularized and infiltrated in its superficial layers, but it contains no tuberculous foci.

The choroid shows numerous small nodular infiltrations with plasma cells containing occasionally central foci of endothelial cells, and at the equator a large tubercle, 1.5mm in diameter, to which the retina is adherent. This tubercle is made up of endothelial cells surrounding a central area of necrotic pus cells. The latter does not represent actual caseation; in fact, caseation is absent from all the lesions in this eye.

In the main mass of exudate within the vitreous, bacilli are found only when in clumps, and these stain so feebly that they are visible simply because they are massed together. No bacilli are found in any of the other lesions except in the large tubercle of the choroid, in which a few poorly stained bacilli can be seen.

EXPERIMENT V.—Injection of dead tubercle bacilli into anterior chamber of left eye of rabbit which had healing tuberculosis of right eye. The right eye had been inoculated with the bacillus of lupus five months previously (Figures 2, 5, and 6).

Two days later the left eye was congested, there was some exudate in the anterior chamber, and the corneal puncture wound was infiltrated. This active reaction began to subside after one week. After one month there was a vascularized tubercle at the site of the corneal puncture and several tubercles at the pupillary margin of the iris.

After two months there was very little congestion, the corneal tubercle was smaller, and there was a large nodule at the limbus below.

After four months the corneal tubercle is apparently healed, the pupil is dilated, leaving numerous tubercles at the end of synechiæ on the lens surface. The eye is almost free from congestion. The nodule below is 5mm in diameter, and involves the sclera and cornea. Enucleation of left eye.

*Microscopic Examination.*—There are numerous tubercles of the iris, most of them small, on the surface and within the stroma. About them there is considerable infiltration, with plasma cells, but no pus cells. Foci of endothelial cells are found in the filtration angle here and there, but there is scleritis only below. Here there is a large conglomerate tubercle involving the sclera and cornea, but affecting the ciliary body very little. The sclera has been weakened, so that there is a small intercalary staphyloma, and it shows more involvement superficially than deeply. The cornea also is mainly involved in its outer layers. There is a deep

discrete focus, however, which originally had evidently extended outward from the ligamentum pectinatum, that has undermined and curled up Descemet's membrane. There is marked plasma cell infiltration around these foci but no purulent infiltration except in the centers of one or two. A few endothelial nodules are seen on the posterior surface of the cornea.

On and within the ciliary processes a number of minute foci of endothelial cells are found below. These are situated sometimes on the tips of the processes, sometimes on their sides, but none is seen in the sulci between them. Some of them are entirely within the stroma and covered with intact epithelial layers (Fig. 6), others are entirely on the surface, and still others partly within and partly without the surface, the epithelium here being broken through (Fig. 5).

The choroid shows a number of flattened foci, some of them occurring even posterior to the equator. Each consists of a few central endothelial cells surrounded by a dense zone of plasma cells.

The tubercles in this eye present a somewhat different picture from those of shorter duration in the previous experiments. Here, instead of the endothelial cells being round and discrete, with single nuclei, most of the cells are irregular in shape, many of them multinucleated, and are united with each other by processes, thus forming a syncytium. In the interstices Van Gieson's stain shows connective tissue making its way from the periphery, accompanied by connective-tissue cells. None of the lesions shows caseation. Tubercle bacilli are seldom found, none being seen in the small foci, such as those in the iris, and after a long search only one or two poorly stained discrete bacilli in the scleral tubercle. A few clumps of bacilli, however, are found in the latter.

The above experiments show that, when dead tubercle bacilli in sufficient numbers are introduced into the vitreous or anterior chamber of a rabbit, many are carried to the filtration angle, where, after about three months, they produce nodules in the corneo-sclera closely simulating those of sclero-keratitis in man. At the same time lesions are produced in the iris and choroid, and, in case of injection into the vitreous humor, also in the retina. Usually the ciliary body is involved along with the sclera, and this constitutes the chief difference between the experimental scleritis and the natural disease. This difference is probably due to the facts that the



size of a lesion produced by dead bacilli is dependent upon the number of bacilli present at its inception, whereas in case of the natural disease, presumably due to living bacilli, the size of the lesion is dependent upon the suitability of the soil for the proliferation of the bacilli. Thus, in the latter case, the living bacilli, finding no doubt the cornea and sclera owing to their poor blood supply especially favorable for their growth, involve these structures almost exclusively. In spite of these facts, however, in several instances lesions of sclero-keratitis occurred in the experiments with practically no involvement of the ciliary body. No discrete foci occurred in the cornea away from the limbus, evidently because dead bacilli could not be carried into the cornea in sufficient numbers.

In both size and number the lesions in the filtration angle and sclera were much greater than any other lesions in the eyes, showing that more bacilli lodged here than elsewhere. They did not occur exclusively below, as might have been expected, but where the bacilli were introduced into the vitreous humor were more numerous laterally, and some small ones occurred directly above. This fact tends to nullify the objection to the theory previously pointed out by me, namely, that the nodules in human cases are more frequent above than below. In the case of the natural disease the bacilli, of course, could not occur in such large clumps, and hence would have less tendency to settle to the bottom of the anterior chamber. It is not necessary to assume that the bacilli were carried from the vitreous humor by the actual flow of fluid, since their transition may have been due to the frequent movements of the eyes. In the experiments in which the bacilli were introduced directly into the anterior chamber, the scleral nodules always developed below, due evidently to the fact that the clumps of bacilli did not have time to disintegrate to any great extent.

The tubercles of the iris in these experiments occurred most commonly near the pupillary margin. They were most often on or just beneath the anterior surface, though occasionally one was seen deeply seated in contact with the pigment layers. Tubercles similar to those on the anterior surface of the iris were also found on the posterior surface of the cornea.

The tubercles of the retina, seen in Experiments I, II, and IV



are probably of no great significance in regard to human ocular tuberculosis, the conditions under which they occurred being too far abnormal. They were undoubtedly due to bacilli which penetrated the retina from the vitreous humor. They are of interest in showing how slightly the retina reacts to tubercle bacilli, single bacilli and even clumps having passed through the retina to the pigment epithelium before causing lesions, which, moreover, destroyed the outer retinal layers only. The cells forming the tubercle were derived chiefly from the choroid. In the natural disease such foci would not often occur, because the bacilli would be carried to the anterior chamber rather than into the relatively solid vitreous. In two cases of tuberculous cyclitis, however, I have seen tubercles of the retina, one of them of considerable size, which were probably due to bacilli deposited from the vitreous. Of still less practical significance were the small tubercles found on the surface of the retina in these experiments, and others occurring isolated in the vitreous humor.

Of greater import were the tubercles of the choroid which did not involve the retina. These occurred chiefly in the anterior part of the choroid but occasionally also in the fundus (Fig. 8). In the experiments in which bacilli were injected into the vitreous humor and retinal tubercles resulted, it is conceivable that the choroidal tubercles were due to metastases from them in the post-choroidal space. This explanation is not possible, however, where the injections were made into the anterior chamber, for retinal tubercles were absent. Here it is certain, excluding the remote possibility of blood metastasis, that the choroidal foci were due to bacilli carried from the filtration angle in the post-choroidal space. These experiments strongly indicate, therefore, that the choroidal lesions sometimes seen in cases of human scleritis are produced in the same way and are not blood metastases. They also suggest the possibility, at least, that this is true also for the majority of the relatively benign forms of tuberculous choroiditis.

The fact that dead tubercle bacilli can produce tubercles is, of course, well known, and need not be discussed here at length. The smaller experimental lesions show essentially the same histologic character as I have found in the lesions of human cases of tuberculous scleritis and keratitis. Both

consist at first of discrete endothelial cells which later unite by processes forming a syncytium into the meshwork of which connective tissue makes its way. In the human lesions caseation almost never occurs, and in the experimental lesions it occurs only in the largest tubercles in which bacilli are present in excessive numbers. Langhan's giant-cells are found with about equal frequency in both. In the smaller experimental lesions remarkably few bacilli are often found, in single sections of a lesion sometimes none being seen. This fact makes it less difficult to understand why bacilli are most often impossible to find in human lesions.

These experiments, of course, do not throw any direct light on the question as to just how the bacilli reach the aqueous, as we may now assume they do, in human cases of chronic ocular tuberculosis. In the case of scleritis already referred to, I found focal lesions on and just beneath the pars ciliaris retinae, and assumed that these were the sources of the bacilli causing the active scleritis. It was clear, however, that the older corneal and scleral lesions in this case could not have been due to them, and this, with the fact that in certain other cases ciliary lesions were absent, led me to believe that the bacilli might pass into the aqueous from the vessels of the ciliary body without producing any lesions in their transit. The results of the present experiments now suggest this to be the rule instead of the exception, and that, when focal lesions on the ciliary body occur such as just noted, they do not represent direct metastases from the blood but are due to bacilli, or infected cells which have been deposited from the aqueous. For, in some of these experiments, minute tubercles were found both upon and even entirely beneath the epithelium of the ciliary body processes. Those beneath the surface were clearly due to groups of endothelial cells which had broken through the epithelium, the latter then re-forming over them, for all stages in this process could be made out. Had these small foci contained living tubercle bacilli, they would have grown to larger size. These observations thus make it seem more than probable that the most common types of tuberculous, cyclitis and iritis, even when not associated with scleritis or keratitis, are also due to bacilli or infected cells deposited from the aqueous humor.

The two experiments in which dead tubercle bacilli were injected into eyes of rabbits previously immunized to tuberculosis, gave some interesting results which may further explain the difficulty of demonstrating bacilli in human cases of chronic ocular tuberculosis. The immunization was accomplished by infecting one eye of each rabbit with the living bacilli of lupus. When dead bacilli were injected into the vitreous of the normal eye they quickly caused it to become infiltrated with pus, a reaction no doubt analogous to that of the v. Pirquet test. The purulent exudation soon ceased and the pus became necrotic, but the bacilli evidently became free from it and were carried to the anterior chamber, since endothelial tubercles were produced on the iris and filtration angle as in the case of non-immune animals. When the bacilli were injected into the anterior chamber directly, they likewise gave rise to a prompt and severe pyogenic reaction which quickly subsided, and later produced tubercles as usual. But the fact of especial significance in these two experiments was that most of the bacilli lost their acid-fast properties, due, probably, to the action of the animals' immune serum. Thus, except in the clumps where they were visible on account of being massed together, almost no bacilli could be found, the few seen after prolonged search staining poorly. In spite of this, lesions were produced equal in size to those of the other experiments in which the bacilli were still demonstrable. It must be noted, however, that even in the latter a small proportion of the bacilli stained feebly. It is conceivable also that in all the experiments lesions were due in part to non-acid-fast bacilli introduced from the original cultures.

A fact now well established is that the aqueous humor is relatively free from immune substances, except when, as a result of paracentesis or an active intraocular inflammation, it becomes mixed with serum. This may be of considerable importance in regard to the origin of chronic ocular tuberculosis, for, if living bacilli should reach the aqueous, it is obvious that they would not be held in check as in the blood or tissues, and hence might proliferate. Should they do this, it would greatly increase the chances for metastases to occur in the sclera or elsewhere. Moreover, owing to the large number of bacilli present, the lesions would tend to progress even though



the bacilli were soon killed or inhibited by the immune substances reaching them in their new locations. This may explain the resistance of the lesions to treatment in spite of the fact that they ultimately always heal. The fact that tubercle bacilli cannot be demonstrated in the lesions is no argument against this view, since, as just explained, their acid-fast property may have been destroyed by the action of the immune serum to which they were finally subjected.

The foregoing considerations are suggestive in regard to the treatment of chronic ocular tuberculosis. In the first place they suggest that frequent paracentesis of the cornea would be advantageous in all cases, including cases of iritis as well as of scleritis and keratitis, since it would bring immune serum in contact with the intraocular lesions and probably also with those of the cornea and sclera. They also suggest the advisability of local treatment of the corneal and scleral lesions. This could be accomplished by means of the knife, actual cautery, or possibly by injections of strong antiseptics.<sup>1</sup> Although these latter procedures would result in a certain amount of scarring, this should ultimately be less than if the lesions were allowed to progress without such interference.

#### CONCLUSIONS.

When dead tubercle bacilli are injected into the vitreous humor or anterior chamber of a rabbit, they produce, after about three months, lesions in the corneo-sclera closely analogous to those of tuberculous sclero-keratitis in man. Smaller tubercles are produced on and within the iris, and still smaller ones on and within the ciliary processes. The latter are of special significance, as they indicate that the foci in human cases of tuberculous cyclitis are not necessarily due to direct metastases from the blood. Tubercles of the choroid are also produced, due to bacilli passing from the filtration angle along the post-choroidal space.

These observations confirm the theory previously advanced

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<sup>1</sup> Experiments that I have recently made on rabbits' corneæ indicate that Lugol's solution (1 : 2 : 100) is effective for this purpose, and that it causes remarkably slight scarring. It is also effective for other localized infections of the cornea.



that tuberculous scleritis and keratitis are due to infection from the aqueous humor through the filtration angle. They also strongly suggest that the chronic types of tuberculous iritis and cyclitis, and possibly choroiditis, are likewise due to metastases from the aqueous humor, the bacilli reaching the latter from the vessels of the ciliary body. The lack of immune substances in the aqueous humor no doubt increases the chances for such metastases to occur. In addition, these observations suggest certain procedures in regard to treatment.

## TWO CASES OF CHRONIC GLAUCOMA SIMPLEX TREATED BY IRIDOTASIS.<sup>1</sup>

By DAVID HARROWER, M.D., WORCESTER, MASS.

(With two drawings in the text and Text-Plate X.)

IN the ARCHIVES OF OPHTHALMOLOGY, Volume XL., No. 4, page 405, I read a most interesting account of Johan Borthen's operation for the treatment of glaucoma by iridotasis. This, according to Borthen, was a decided step forward from the operation of Holth, who in 1907 reported an operation intended to reduce tension of eyes in glaucoma.

This operation he called iridencleisis. This was intended to produce a fistulous opening between the anterior chamber and the subconjunctival lymph-channels by incarcerating the incised iris in the scleral keratome incision, and allowing the conjunctival flap to heal over it. Borthen says:

"I have always doubted the advisability of incising the iris and making a flap for incarceration, believing this part of the operation to be unnecessary, and convinced that the same effect could be produced by inclusion of a fold of the iris, allowing the posterior surface to coalesce with the subconjunctival tissues, assuring a position of the sphincter external to the section, and with this free drainage. This modification has the advantage of avoiding a step of the operation—incision of the iris—which requires skilful technique and a good assistant to hold the conjunctival flap down on the cornea during iridotomy. If reduction of tension depends on filtration, as I believe, and a fistulous communication is not a *sine qua non*, this modification of mine would afford a simple

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<sup>1</sup> Read at the meeting of the American Ophthalmological Society, Washington, D. C., 1913.

ILLUSTRATING DR. HARROWER'S ARTICLE ON "TWO CASES  
OF CHRONIC GLAUCOMA SIMPLEX TREATED  
BY IRIDOTASIS."



Photograph of filtering cicatrix, Case No. 2.





and effectual substitute for Holth's rather complicated procedure. . . . The operation is performed as follows: The conjunctiva is grasped with fine straight forceps about 10mm back of the upper limbus and a cut 2-3mm long made in the raised conjunctival fold with ordinary iris-scissors. The scissors are then carried toward the limbus, dissecting a conjunctival flap and keeping as near to the scleral surface as possible in order to include a large amount of subconjunctival tissue in the flap. Care must be taken to avoid fenestrating



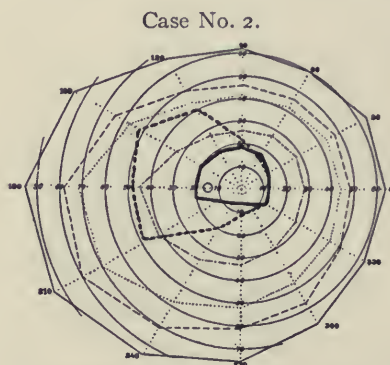
Unbroken line, Field May 17, 1912.

Broken line, Field April 17, 1913.

the conjunctiva near the limbus as this would not only expose the incarcerated iris to infection but interfere with filtration as well. The globe is now held with fixation forceps, and the lance knife, with a stop, introduced about 1mm back of the sclero-corneal margin, and carried down through the anterior chamber until the section is 4-5mm long. The conjunctival flap can be made by means of the lance knife when making the incision, but dissection with scissors insures the inclusion of subconjunctival tissue in the flap, and I believe this is a matter of practical importance for filtration and the formation of a subconjunctival bleb. The iris is now grasped at the sphincter with the iris forceps, taking up a fold 1-2mm wide, drawn out through the section and left there. . . . A drop of atropin, instilled ten minutes before operation, will insure the permanency of the prolapse, and does not cause increased tension, as I have observed."

The only modification I made in this operation, which is a very simple one, is having my assistant grasp the edge of the conjunctiva, and hold it up straight at right angles to the sclero-corneal surface. Then with a keratome make the incision, which I think would be more difficult when the upper part of the cornea is covered with the conjunctiva. One can thus see the knife during the whole incision.

The results that Borthen reports following his cases for a period of from two or three months to two years are remark-



Unbroken line Field July 17, 1912.

Broken line, Field April 9, 1913.

able. I have only had an opportunity to do two of these for chronic glaucoma. I have seen no others reported, but the results have been so striking that I wish to draw them to the attention of the members of this Society.

Mrs. M. E. aged 60. Came to me August 14, 1911. The vision of her right eye has been growing dim for the last year or two. She can see simple movements of the hand; the field of vision, is very much limited out, up, and in. The disk is cupped. She has not seen well for a long time with this eye. In the left eye she has  $\frac{3}{10} + 75$  D.  $\text{C} + 50$  D. cyl. ax.  $160^\circ = \frac{3}{10}$ . The vision in this eye has been growing dim lately. The disk is cupped. The field limited up and out. The tension is  $+$ . I gave her pilocarpin 1% to use twice a day.

Aug. 29th. Has improved to  $\frac{1}{10}$  (?). That is with a glass.

Sept. 30th. Is about the same. Pilocarpin continued.

Oct. 11th. Is doing nicely. I then gave her aspirin gr. 5, three times a day.

Nov. 14th. I gave her a reading glass and repeated the aspirin.

Feb. 13, 1912. Her vision is not quite so good.  $\frac{8}{10}$  with correcting glass.

Mch. 15th.  $\frac{10}{10}$  (?) with correcting glass.

May 17th.  $\frac{8}{10}$ . Field has diminished. Operation advised.

June 15th. Following out Borthen's instruction as near as I could, I did an iridotomy. I found a little difficulty in getting the conjunctiva out of my way, but with my assistant holding this with a pair of forceps I succeeded very well in making my cut with a keratome. This patient had no trouble, no irritation. The whole wound healed very kindly, but with correcting glasses her vision had dropped on August 1st to  $\frac{5}{10}$ .

Sept. 12th. It was still  $\frac{5}{10}$ .

I saw her Dec. 18, 1912, and her vision was  $\frac{5}{10}$ . Her field had enlarged, as you will see here by the various charts that I show you.

I also saw her on April 17th. Her vision was with + 75 combined with + 50, axis at 90°,  $\frac{8}{10}$  (?); with + 5.50 combined with a cylinder she could read Jaeger 3. The tension has been normal since the operation.

Through the courtesy of my colleague, Dr. Lovell, on July 17th I saw Mr. O. G., aged 59. He has had chronic glaucoma for six months or more. The right eye has simply perception of light, deep cupping of nerve, and tension + 3.

The right eye is  $\frac{8}{10}$  (?); central vision; tension + 2.

July 23d. Assisted by Dr. Lovell, I did an iridotomy. This man went along beautifully with the result of  $\frac{8}{10}$  vision. The field, as you will see, on July 17th was very limited.

On Aug. 6th, about three weeks after the operation, there was a large increase in nearly all directions of the field.

I present his field on April 9, 1913. The vision has increased to  $\frac{10}{10}$  practically.

Of course this does not prove a great deal, as one ought to have more than two cases to report. Still these two cases have been exceedingly gratifying, and I hope, as I see more cases of chronic glaucoma, I will have an opportunity to perform this operation oftener, and hope at some future time to be able to report another series.

## THE REPORT OF A CASE OF MICROPHTHALMUS WITH ORBITAL CYST (R.); PARTIAL MICROPHTHALMUS WITH INTRAOCULAR CHANGES (L.).

By F. PHINIZY CALHOUN, A.B., M.D., ATLANTA, GEORGIA.

(With three figures on Text-Plate XI.)

THE congenital abnormality of microphthalmus with or without an orbital cyst is of such rare occurrence that the report of a case with histological findings is worthy of consideration.

The condition was first discovered by Arlt in 1858; Talko in 1880, who had observed 7 cases, considered that no communication existed between the cyst and the eye and that it was the intra-uterine cyst which prevented the development of the eye. The abnormality is generally described as being bilateral, and the globe while apparently absent can generally be detected by very careful examination and palpation. There is impaired mobility to the lids and the palpebral aperture is narrowed. Usually there exists a round and fluctuant tumor of the lower lid which can be transilluminated. This swelling causes an ectropion of the lower lid, and on account of exposure the conjunctiva hypertrophies.

Hess and others have proven conclusively that there is definite communication between the cyst and the eye.

Parsons *Pathology of the Eye* mentions two chief theories as the cause of these cysts. That of Arlt, the generally accepted one, is that the cyst is due to the extreme development of ectasia in or about a defectively closed foetal cleft. Kundrat's theory is that the cyst is formed from a non-invaginated primary optic vesicle. The cyst wall is composed of fibrous tissue derived from the sclera; the choroid is absent; vitreous or embryonic tissue has been found; there are present layers of retina, well defined in some cases (Collins) of a "perverse" arrangement, but usually rudimentary in character,



...one accompanying ...



FIG. A. Showing specimen with cyst walls retracted with thumb forceps. 1. Cornea. 5. Cyst wall. 6. Optic nerve. 7. Muscle.

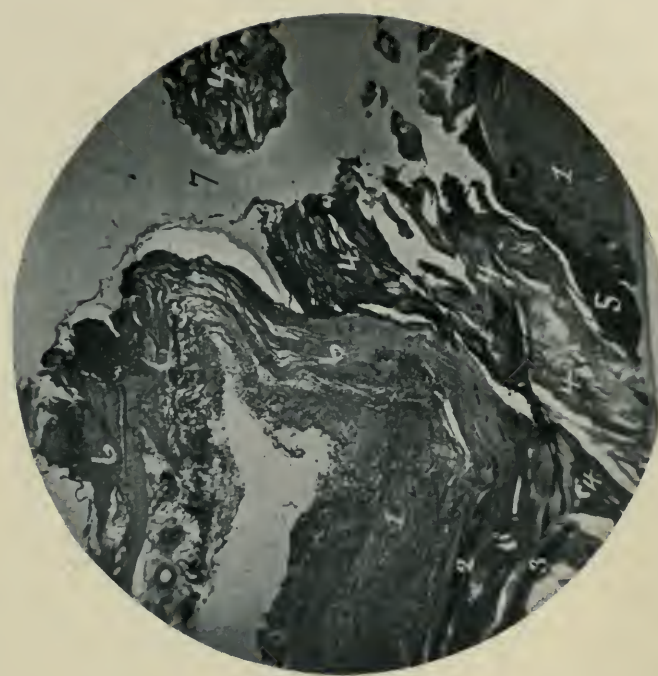


FIG. B.  $\times 2.5$  diameters. Globe divided in line of nerve. 1. Cornea. 2. Calcified lens. 3. Degenerated vitreous. 4. Sclera. 5. Cyst walls. 6. Optic nerve. 7. Muscle tissue. 8. Cavity of cyst. x. Choroidal fissure under this mark.

FIG. C.  $\times 125$  diameters. Showing remains of choroidal fissure. 1. Sclera. 2. Choroid. 3. Bone. 4. Retina. 5. Choroidal pigment. 6. Cyst wall. 7. Cyst cavity.



On account of certain intraocular defects and the partial microphthalmic state of the opposite eye in the case to be described, I herewith briefly relate the theories advanced in cases of microphthalmus without cysts. Two theories are here advanced: One of defective development, warmly supported by Hess and Collins; another, the theory of intra-uterine inflammation, advocated by Deutchmann. Hess's report of a hyaloid artery surrounded by dense connective tissue, beginning at the papilla and passing forward to be attached to the lens, seems to offer evidence of the developmental theory, for he considers this fibrous tissue to be an atypical development of the vitreous. For the support of the inflammatory theory, much evidence of inflammation exists in the eyes examined, such as posterior synechia, detached retina, hyaline membranes in the anterior chamber and on the iris, bone formation, and retinitis pigmentosa. The following case was recently observed in my clinic and the history was obtained from the mother of the patient, an intelligent negro woman:

*History.*—John F., age 6, colored, eyes have always been defective and soon after birth there developed an acute purulent inflammation in each eye, lasting four weeks, which was treated by an oculist. This was undoubtedly ophthalmia neonatorum. The mother states that from birth the right eye had always been smaller than the left. There is no history of consanguinity of parents or heredity disease. The health of the father and mother is good and their eyes are normal. The mother has had one pregnancy, brought to full term and born without complications—the case under consideration.

*Examination.*—The patient appeared to have only a left eye; there was little motion to the upper lid of the right eye, an ectropion with hypertrophy of the conjunctiva of the lower lid, and a very prominent cystic swelling of the lower lid which on pressure was reduced, causing a bulging of the orbital contents. The cyst-like swelling in the lower lid on transillumination appeared translucent. Examining the orbital contents by palpation, a movable mass, about the size of a hazel-nut, could be detected, and by stretching the conjunctiva over this mass a small dark area was seen which I took to be a rudimentary cornea. The case was typical of microphthalmus with an orbital cyst and an enucleation was advised. This was done under ether, dissecting a very contracted globe like phthisis bulbi and a

well-defined, fairly thick-walled cyst; on excising the optic nerve, the cyst wall was cut and the contents evacuated, which consisted of a straw-colored watery fluid. It was observed after the operation that the infraorbital ridge was considerably depressed, to the extent of 6mm compared with the horizontal plane of the opposite side. Healing was uneventful, and in time a well-fitted artificial eye was adjusted. The left eye was equally as interesting. The eye in its normal position looked upward, with the lids wide apart, and there existed a rotary nystagmus. The horizontal diameter of the cornea was 8mm, and the external structures appeared normal except for the smallness of the globe. The pupil would dilate only to 4mm after four days of atropine drops, and while under an anæsthetic a very painstaking examination of the fundus was made. The lens was clear except for a posterior capsular cataract. The fundus could be seen very indistinctly on account of white glistening bands of tissue scattered throughout the vitreous. No outline of the nerve head was observed, but, tracing a few retinal vessels to a center, a dark conglomerate area in about the position of the nerve was detected, and from this point into the vitreous there expanded numerous white shiny connective-tissue bands. Throughout the retina and extending as far forward as I could see, were smaller black pigment spots similar to retinitis pigmentosa. There were a few large areas of whitish silvery spots which I thought to be in the retina. There were also regions in the lower segment which resembled old retinal detachments and some of these folds were in communication with the connective-tissue bands spreading from the region of the obscured papilla. From this picture, I was much impressed with the fact that it was of inflammatory origin. Vision was extraordinarily good and the boy had no trouble in finding his way about in strange places and could recognize large objects about a room.

*Histological Examination.*—The globe and the cyst after enucleation were placed in 10% formalin solution and when ready for imbedding they were found much shrunken and contracted, making the microscopical examination most difficult and the photographs here presented rather unsatisfactory. The size of the hardened globe (Fig. A) was 10.5 x 12mm x 9.5mm antero-posteriorly. A discolored area anteriorly (Fig. A1), appearing as the remains of the cornea, measured 6.5mm in diameter. The optic nerve (Fig. A6) is shown attached to the side of the globe. It measured 13.5mm and was adherent to the outer surface of the cyst wall. The lens (Fig. B2) was displaced, and both it and the vitreous (Fig. 3) had undergone calcareous



degeneration. The cyst wall (Fig. B5) was thin and had been opened posteriorly in a couple of places; in its contracted form it measured  $27 \times 30mm$ . The outer surface of the cyst showed a little fat and on one border a small mass of muscle tissue. The globe was divided and from one half the calcareous tissue mechanically removed, with a view of retaining the best staining qualities of the tissue remaining and at the same time preserve a good macroscopical mount. Sections were not quite satisfactory. However, they showed a thickened and slightly vascular cornea, with some new-formed connective tissue. The iris was a disorganized mass, leaving a shallow clear space as the remains of the anterior chamber. A small portion of the ciliary body remained and the processes were present. The choroid appeared on an irregularly thickened layer with small patches of bone here and there. It contained a liberal supply of rather large blood-vessels filled with blood; the leucocytes being greatly in excess of the normal proportion. Elements of the disorganized retina were heaped up and fused with the inner layers of the choroid in irregular masses. The sclera was thick and somewhat similar in appearance to that found in phthisis bulbi. A vena vorticiosa was observed filled with choroidal pigment. A deposition of lime salts was observed on the outer surface near the nerve. The cyst wall was composed of connective tissue arranged in a manner similar to sclera. The remains of the choroidal cleft was found in the second half of the globe, about  $2mm$  below the entrance of the nerve and immediately below the x which will be found in Fig. B. It measured a little less than  $1mm$  in diameter and was the only means of communication between the vitreous and cyst cavities. Its lumen was filled with retinal tissue and choroidal pigment which extended but a short distance into the cavity of the cyst. See Fig. C. Retinal elements were not found elsewhere in the sac, though some collections of small round cells were found in the substance of the wall, which might possibly be regarded as the remains of the nuclear layer.

In conclusion, from the microscopical examination of the enucleated eye and the ophthalmoscopic examination of the good eye, there is much evidence of a prenatal inflammation, embryonic structures and changes being, however, considered.

I am indebted to Dr. George S. Dixon of the New York Eye and Ear Infirmary for his careful work in the preparation and report of the specimen.

## REPORT OF A CASE OF TRAUMATIC EQUATORIAL RUPTURE OF THE SCLERA.<sup>1</sup>

BY DR. ARNOLD KNAPP, NEW YORK.

(With one illustration on Text-Plate XII.)

THE following case is noteworthy on account of the atypical site of the rupture and the unusual clinical features associated with it.

Mrs. M. B., 68, on March 29th, fell, striking the left eye against a table. There were wounds of the left upper and lower eyelids near the caruncle, the upper lid in fact being completely divided by an irregular vertical wound.

The eye was very red; the anterior chamber was unusually deep, the upper part of the iris especially being forced back; the lens seemed in place, though dislocated backward. No fundus reflex; no light perception; some blood could be seen with oblique illumination in the vitreous. Tension not reduced. No sign of any scleral rupture. After 10 days the redness had become less and, on retracting the upper lid and with the eye looking far down, a bluish, slightly raised area could be seen under the conjunctiva, up and out. The tension remained good. No light perception. As the eye remained inflamed and sensitive, it seemed advisable to remove it.

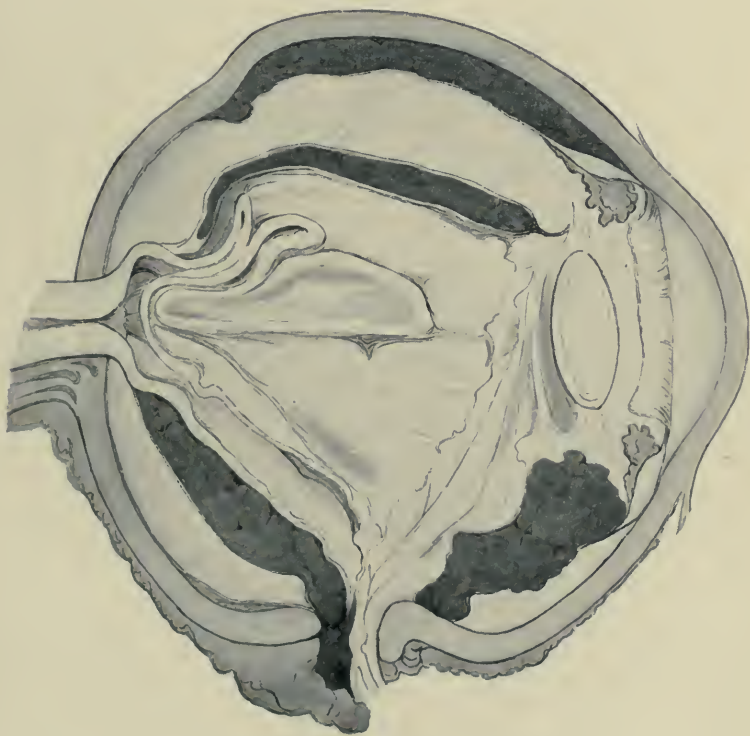
Enucleation April 15, 1913. On dissection, the conjunctiva was found very adherent up and out in the region of the bluish mass previously noted, and at that point there was an escape of watery, blood-stained fluid. The greatest care was exercised not to cut in to the sclera; the optic nerve was first cut and the adherent area was separated from behind.

The enucleated eye showed an open wound in the sclera just at and running concentric to the equator, about 10 mm

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<sup>1</sup> Specimen presented before the Section on Ophthalmology, N. Y. Acad. Med., April, 1913.

ILLUSTRATING DR. KNAPP'S CASE OF TRAUMATIC EQUATORIAL RUPTURE  
OF THE SCLERA







long and 2mm posterior to the rectus externus insertion. Projecting through this was an irregular organized blood clot. The eyeball was divided by an antero-posterior section passing through the equatorial rupture, after hardening in formalin; there was some escape of blood-stained, watery fluid.

The divided eyeball presented the following changes: There was a gap in the sclera, about 10mm back of the sclero-corneal junction. The scleral edges of the wound were sharply cut, the anterior edge being distinctly everted outward. The gap was filled with blood-stained tissue containing a knuckle of retina. The retina was completely detached and pressed together, no vitreous chamber or vitreous body remaining. The subretinal space was filled with coagulated blood and a blood-stained, watery fluid. There was a moderate choroidal detachment from blood. The lens was in its place, though dislocated backward, resting upon the detached retina. The iris showed a partial retroversion. The anterior chamber contained a grayish exudate.

Scleral ruptures from indirect blows are usually situated in the typical area, 2-3mm back and concentric to the corneal margin. Ruptures in other locations are extremely rare. Gruening, in the chapter on "Injuries to the Eye," in Norris & Oliver's system, states that in rare cases the scleral rupture is situated in the equatorial region of the globe, and the lens is dislocated into Tenon's capsule, and cites a case reported by Wadsworth and one by Schlodtmann.

Wagenmann ("Verletzungen des Auges," vol. ix., p. 580, *Graefe-Saemisch*, 2d. ed.), in speaking of variations from the typical scleral rupture, states the ruptures may be multiple or the rupture may run meridionally or at the equator, and in some cases scleral ruptures were found present in the posterior half of the eyeball after enucleation. He cites the following cases of equatorial rupture: Wadsworth, "Luxation of Lens beneath Tenon's Capsule," *Amer. Jour. of Ophth.*, vol. ii., p. 144; Montagnon, "Luxation rare du cristallin," *Arch. d'opht.*, vii., p. 204; Weeks, "Bericht über zwei Fälle von Augenverletzung d. stumpfe Gewalt," *Arch. f. Augenh'lk.*, xvi., p. 125. Oeller and Axenfeld have reported equatorial ruptures of the sclera in cases of gouging in the insane (*Zeitsch. f. Augenh'lk.*, i., p. 128).

The clinical features of interest in this case are the preservation of normal tension in an eye with a scleral rupture, and the occurrence of the bluish swelling on the sclera. This swelling proved to be a circumscribed hematoma in Tenon's capsule, over the site of the scleral rupture.

## ON THE TREATMENT OF TRACHOMA WITH IODIC ACID.

BY DR. JOSEF RUDAS IN BUDAPEST.

(From the Eye Division of the Military Hospital in Krakau.)

(Translated from the *Archiv für Augenheilkunde*, Vol. LXXII., No. 1, 1912.)

IN the March number of the *Archiv für Augenheilkunde*, 1906, Schiele recommended the treatment of trachoma with iodic acid. I have had the opportunity of observing the action of this drug in a large number of cases of trachoma. The iodic acid is prepared, according to Schiele, as follows:

℞ Acidi iodici, gtt. viginti  
Gummi arabici (or Aquæ destill.), qu. sat.  
ut fiant bacill. No. III.

The drug may also be administered together with acoin, whereby the pain after treatment is diminished.

℞ Acidi iodici, gtt. viginti  
Acoini, gtt. duo  
Gummi arabici (or Aquæ dest.), qu. sat.  
ut. fiant bacill. No. III.

In looking over the case histories, we find that this method of treatment has replaced all others since the year 1906. In comparing the results of the treatment with iodic acid and by other methods, we find that 583 were treated with iodic acid, while 553 were treated by other methods. The most striking feature is that the period of treatment with iodic acid is twenty days shorter than by any other method—the length of treatment being 44.12 days in the former, and 64.47 days in the latter. The number of complications (ulcer and pannus) is .85% to 3.25%, while the disturbances of vision are

0.51% to 3.07% in favor of the treatment with iodic acid. Relapses occur also more rarely, with a difference of 8%. I think these figures show that this form of treatment deserves a trial. Those cases are adapted for this treatment where the discharge has ceased and the inflammatory symptoms have subsided.

The treatment can be said to consist of three phases: (1) Anæsthesia; (2) Cauterization; (3) After-Treatment.

1. *Anæsthesia.* A few drops of a 5% solution of cocain, instilled from 6 to 8 times, at intervals of from one to two minutes, is sufficient to render the conjunctiva insensitive. Subconjunctival injections are, however, more thorough, and the retrotarsal folds are made more prominent thereby.

2. *Cauterization.* To expose the lower retrotarsal fold, the thumb of the left hand is applied to the lower lid, below the eyelashes, and the lid is pulled down while the patient looks up. At the same time the index finger of the same hand presses gently upon the tarsal portion of the upper eyelid, in a direction down and in. The iodic-acid rod is then applied with the right hand. Excessive care is not necessary, even if non-infected parts of the conjunctiva be touched, and this acid does not attack the healthy cornea. The cauterized areas are then wiped dry with a cotton tampon, and the superfluous iodic acid is washed off with a 3% boric-acid solution.

The everted upper lid is again everted by means of a pair of forceps in which one branch is introduced between the eyeball and the once everted eyelid. The forceps is then closed and held in place by the left hand, the patient of course looking strongly down. The cauterization is practised as above described, remembering to cauterize the area which is covered by the branch of the forceps. This is accomplished by simply sliding the forceps to one side. The area is then dried and irrigated. Finally, after removal of the forceps and with the lid once everted, the retrotarsal fold, the tarsal conjunctiva, and the region of the caruncle are cauterized. After cauterization, the follicles appear yellow. If any follicles remain that have not taken on the yellow color, they should be again cauterized, followed, of course, by tamponade and irrigation.

3. *After-Treatment.* As soon as the action of the cocain has worn off, the pain begins, which varies, of course. If it



should be very great, a few drops of cocain can be instilled. Just like any cauterizing agent, a violent inflammation is produced, by whose aid the conjunctiva casts off the parts destroyed by the iodic acid. The lids swell, the conjunctiva becomes hyperemic and covered with necrotic particles. In severe cases the eyes are so swollen that the lids cannot be opened. The patient should remain in a dark room and cold compresses should be applied. Severe reactions are unusual. After one to two hours, the pain is usually relieved. When the inflammatory symptoms have diminished, the conjunctiva presents a clean wound surface. It is particularly important at this time to prevent adhesions between adjoining portions of the mucous membrane. This can be accomplished by separating these adherent parts daily. By applying the right thumb to the lower lid and pulling this lid downward, and with the left thumb on the tarsal part of the upper lid, and also pressing this downward while the patient looks down, the adherent parts easily become separated. The wounded areas are then irrigated with the boric-acid solution. The tendency to adhesion subsides after three to four days. A simple conjunctivitis now remains, which we treat with zinc or some other astringent. The patient is then cured.

In the after-treatment we also use the cupro-citrol salve once and then twice daily.

*Results:* In the first stage complete recovery. In the moderately severe cases there is a superficial delicate, scarcely visible scar, which is much less than by any other method of treatment. Third, in the severe cases the results are much better than by any other method. According to Schiele, this method of treatment also gives good results in the presence of ulcer and pannus.

## A METHOD TO KEEP THE UPPER EYELID AND SUPERIOR FORNIX EVERTED.

BY DR. V. GRÖNHOLM, HELSINGFORS, FINLAND.

*(With three illustrations in the text, and two photographs on Plate VIII.  
of the German Edition.)*

I HAVE been practicing for several years a method of everting the upper lid, which allows a free view of the entire upper retrotarsal fold, and at the same time leaves the other hand free to carry out any application or examination. The method is so simple that I think it worthy of report.

The upper lid, including the fornix, can be everted and kept in this position either by the aid of the ordinary Desmarres retractor, or with a specially constructed forceps which I call an eyelid everter. A medium-sized Desmarres elevator is applied with its curved spoon-like part applied to the skin of the upper lid, so that the rim of the spoon looks downward. The eyelashes are taken hold of by the other hand, and the lid is carried over the spoon, which in turn is pressed down, and the handle of the instrument is turned backwards towards the forehead of the patient. The lid is thereby suspended upon the spoon and fixed in this position, by the use of one hand, leaving the other one free. It is well for the patient to hold his head a little back, and to look down. The procedure is explained by Photograph 1.

To make this method painless, the size of the spoon must be selected to fit the eyelid. In other words, small and tight eyelids require a small spoon, while large and relaxed eyelids should be everted with a large spoon. Generally a medium-sized spoon is sufficient. The margin of the spoon should be thick, and its surface rather flat. With an appropriate lid-holder, the turning of the lid does not cause the patient any inconvenience. To prevent, in an unruly patient, a closure of

Fig. 1.



Fig. 2.







the eyelid, it is sometimes well to press upon the margin of the lid with the thumb of the same hand which is holding the retractor. This procedure is applicable particularly in trachoma and in a variety of conjunctival diseases. It enables the medicament to be brought directly in contact with the entire mucous membrane. It is well-known with what difficulty applications can usually be made to the upper fornix.

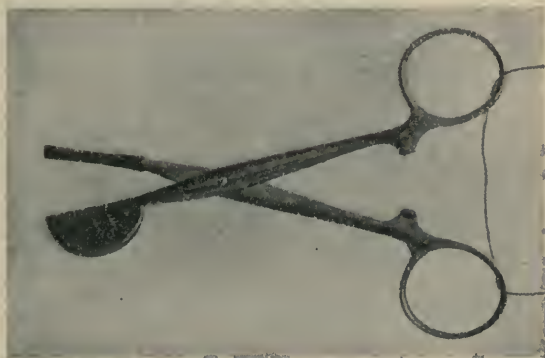


FIG. 1

I have also devised an instrument by which the eyelid is retained in the everted position. This instrument is the ordinary hemostatic forceps of Pean, in which one branch is straight and short, protected with a thin piece of drainage



FIG. 2

tube, while the other is a semilunar plate which is thicker on the convex margin than on its base. It is sometimes advisable to have one of the ends of the instrument in the shape of a T-plate (Fig. 2).

In order to expose the inner and the outer angles of the eyelid, it is better to use a plate which is somewhat obliquely

placed (Fig. 3). The method of applying these forceps is seen in Photograph 2.

The eyelashes are clamped between the branches of the instrument, so that the convex margin of the plate looks up.

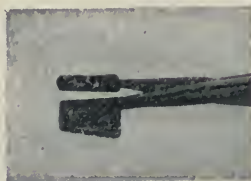


FIG. 3

The instrument is then rotated through an arc of from 180–250°. The margin of the plate then is found to be applied to the upper margin of the tarsus on the cutaneous side of the lid. The tarsus is spread over one side of the plate, while the fornix is exposed over the other. The patient holds his head back and looks down.

This eyelid forceps has been particularly useful to me in excisions of the conjunctiva in trachoma, in extirpation of the tarsus, etc. Lundsgard has used the instrument in the Finsen treatment of the conjunctiva. Its application does not cause any pain, and but little inconvenience to the patient.

REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE NEW YORK  
ACADEMY OF MEDICINE.

By Dr. MARTIN COHEN, SECRETARY.

MEETING OF APRIL 21, 1913. DR. JOHN R. SHANNON, PRESIDENT, IN  
THE CHAIR.

Dr. JOHN E. WEEKS presented a patient, male, 63, with **essential shrinkage of the conjunctiva**, whose eye affection began five or six years ago. At the present time the lower cul-de-sacs are almost totally obliterated. The upper cul-de-sacs are somewhat reduced in depth. There is a slight entropion of the lower lids, haziness of the lower portions of the corneæ, the haziness of the left eye covering about one-third of the pupil below and extending to the margin of the cornea above. There is incipient cataract in the left eye. Fundi present no changes. The condition is apparently one of pemphigus of the conjunctiva. There is evidence of a similar condition of the left eye.

Reporting the history of similar cases, Dr. Weeks stated that treatment is of little avail, the natural tendency being toward progression. Operative procedure for the transplantation of cutaneous flaps might be of service in restoring the cul-de-sacs.

Dr. ARNOLD KNAPP asked whether a Thiersch graft, mucous membrane, or skin graft could be used, and what effect a skin graft would have on a normal cornea.

Dr. WEEKS replied he would use a skin graft in these cases, anchoring the flaps to the periosteum; he did not believe that a Thiersch graft would answer the purpose. He had no experience as to what effect a skin graft would have on a normal cornea.

Dr. WEEKS also presented a case of **exenteration of the orbit for lymphosarcoma**. He had performed a Kroenlein operation, removed the growth and lined the orbit with a Thiersch graft. There had been no recurrences so far.

Dr. J. HERBERT CLAIBORNE presented a case he had operated upon for **ptosis**, describing the operation as follows.

The skin being smoothed, the entire lid is clasped in a large clamp. A straight incision is made from the free palpebral border across the extent of the clamp. An elliptical incision, connecting the inner and outer end of the first incision, exposes the tarsus, the skin removed depending in size to some extent upon the effect desired. Generally, it should be from 5 to 8 or 10mm at the highest point of the elliptical curve. Five stitches are used, a central stitch and four lateral ones, the central one being made with stouter thread. The needle, having passed through the center of the lower cutaneous margin, is received by the forceps beneath the upper margin, the needle is passed through the tarsal fascia, the point constituting the support upon which to lift the lid. Passing the needle out through the upper lip of the cutaneous wound, completes the central stitch. The four lateral stitches are inserted in a similar manner.

A piece of the tarsus, 15 to 20 x 3 to 4mm, in the shape of a parallelogram, is removed at a distance of 3 to 4mm from the inferior margin, cutting through the mucous membrane and fenestrating the tarsus; no stitch is taken in the tarsus at all. The stitches are tied together without buckling, and the clamp is removed.

Dr. Claiborne has not found it necessary to undermine the upper lip of the cutaneous wound with scissors. He attributes the good results in this operation, which he has exclusively used for fifteen years, to the fenestration of the tarsus and stitching through the tarso-orbital fascia, and he fails to see why more complicated and difficult procedures should be resorted to.

In the present case, the ptosis had persisted for several years from what appeared to be a third nerve paralysis, the patient being practically unable to raise the lid except for a few minutes. A paralysis of the superior rectus still persists. A slight central elevation of the lid, due probably to the



central stitch having been tied too closely, disappeared about one month after the operation, and the final result is an unusually good one.

Dr. Claiborne claims this to be his original operation in so far as it constitutes modifications and combinations of several other methods, but distinctly different from any one of them singly.

Dr. ROBERT G. REESE found the result in the present case to be excellent, and inquired whether the levator muscle was paralyzed, to which Dr. CLAIBORNE replied that there was a partial paralysis and some paralysis of the superior rectus.

Dr. WEEKS also thought that the levator had some action.

Dr. ELBERT S. SHERMAN presented an unusual case of **atrophy of the retina**. Patient, a female, aged 23, presented the following unusual fundus picture: Atrophy of retina and choroid, large irregular dark brown patches of pigment, sclerosis of choroidal vessels, and partial optic atrophy. Vision has been poor as long as she can remember. There is nothing of interest in her family history except that her parents were third cousins. When 13 years old, she was treated for anemia and at 15 for rheumatism. Has been under observation for four years, during which time vision has been  $\frac{6}{20}$  with each eye. The fields are considerably contracted. Hemeralopia is a prominent symptom.

Dr. W. E. LAMBERT thought it unfortunate that the field of vision was not taken earlier, to which Dr. SHERMAN replied that the contraction was only unilateral.

Dr. ARNOLD KNAPP presented a specimen of **equatorial rupture of the sclera**. (Reported in full in this number.)

Dr. JAMES G. DWYER reported two cases of **ocular nerve paralysis**, because of the fact that the paralysis in each case was due to widely different causes and because he thought the reason advanced as to the cause in the second case cleared up a hard point, namely the occurrence of abducens paralysis in simple mastoiditis.

CASE 1.—Patient, male, was operated upon for a tumor of the bladder under intraspinal stovaine anesthesia, employing the usual technique. He had never had any trouble with his eyes. On the tenth day after the operation he complained of diplopia. Examination showed complete paralysis of the

right abducens, which continued for about two weeks and then went on to complete recovery. Three weeks later the diplopia returned. Examination showed complete paralysis of the left trochlear and abducens, the left eye pointing downward and inward toward the nose. This condition persisted for about 6 weeks, but under strychnine and potassium iodide treatment and daily exercises with prisms, complete recovery resulted. Wassermann negative.

The author thinks this was a case of toxic neuritis, but why the 6th and 4th nerves were singled out, was a question.

CASE 2.—Patient, male, presented all the symptoms of acute mastoiditis, and complained of diplopia for two days. There was complete paralysis of the right external rectus, the side of the affected mastoid. The latter was immediately operated upon and on the following morning the diplopia had practically disappeared. It reappeared in the course of thirty-six hours and had persisted to the present time. Dr. Haskin would explain the probable cause of the paralysis as being due to pressure.

Dr. WILLIAM H. HASKIN had formed a theory as to the relationship of eye conditions in regard to the fundus as well as to the nerve paralyses, based upon an examination of many skulls. In his paper which was now in print, he advanced the explanation for the paralysis of the sixth nerve in acute mastoiditis as being due to involvement of the inferior petrosal sinus, through which the nerve passes. Either pressure on the sixth nerve or interference with its sympathetic nerve supply, controlling vasomotor supply, would explain very simply the condition found.

Dr. ARNOLD KNAPP mentioned the fact that paralysis of the sixth nerve had been noted in acute middle-ear disease by Gradenigo and others.

Dr. DWYER replied that he was aware of that fact, but no explanation had been proven, as far as he knew, for the cause of it. No doubt many cases appeared as simple otitis media or mastoiditis, in which there was an aseptic clot in one or more of the sinuses, the pressure of which may give rise to paralysis without any clinical signs of the clot.

Dr. ANNA WESSELS WILLIAMS, of the Division of Labora-

tories of the New York Health Department, read a paper entitled **Trachoma in New York City school children.**

For the past three years the Research Laboratory of the New York City Health Department has been studying about 4000 cases of trachoma and allied diseases in the New York City school children, including all forms of conjunctivitis, folliculosis, keratitis, ulcers of the cornea, etc. Throughout the course of a large number of cases of hypertrophic and follicular conjunctivitis (often diagnosed as papillary and granular trachoma, respectively), which had been seen and treated from the beginning without operation, there was neither pannus nor scar tissue. A large number of these have been completely cured. The number of cases developing hypertrophic conjunctivitis after acute catarrhal conjunctivitis, was large as compared with those following folliculosis. If all the cured cases were true trachoma, then practically all cases of trachoma seen and treated from the beginning have been cured in a comparatively short time; if they were not true trachoma, then there is practically no trachoma now in the lower city of New York, the reputed hotbed of this affection.

Another complication shows (1) the great prevalence of the group of hemoglobinophilic bacilli in acute, subacute, and chronic conjunctivitis cases; (2) the coincident occurrence of this group of bacilli and trachoma inclusions; (3) the prevalence also of non-hemolyzing streptococci; (4) the rarity of gonococci.

In pure culture, the hemoglobinophilic bacilli show morphologically a cycle of development similar to that of the trachoma inclusions. This fact, together with the coincident occurrence of inclusions and bacilli in the hypertrophic cases, has led the investigators to form the hypothesis that the so-called "trachoma inclusions" are nests of these minute bacilli which have undergone the same change of metachromatic granule production within the epithelial cells as in the pure cultures.

These bacilli probably belong to the great influenza group of organisms in quite a narrow sense, and their variations in virulence may be compared to the group of streptococci. Certain bacteria, especially the frequently found non-hemolyz-

ing streptococci, may help the virulence of these bacilli, while other organisms, such as the gonococcus, may favor a more rapid and favorable course in infections with these bacilli. This might explain the findings of Cohen and Noguchi in cases which contained both trachoma inclusions and gonococci and recovered comparatively rapidly.

The fact of the gonococcus being able, morphologically, to produce trachoma-like inclusions, may explain apparently contradictory findings reported by several investigators.

By instituting home visits, instructing parents in hygiene—especially of the eye,—and by using a card system of individual records, comparatively few subacute and chronic cases have been observed. Such records should be kept everywhere in the City by the Health Board and by all ophthalmologists.

Dr. WEEKS regarded the report as a very interesting one. He considered that the terminology varied and that papillary trachoma did not exist; nor did he believe that the Koch-Weeks bacillus ever caused trachoma.

Dr. PARK, although confessing that he had no special knowledge of eye affections, felt convinced that the work of Dr. Williams was of an excellent character.

Dr. KNAPP could not agree with the statement that there was no cultural difference between the influenza and the Koch-Weeks bacillus. If Dr. Williams's contention is correct, why were not cell-inclusions found more frequently in cases of acute epidemic conjunctivitis (pink-eye)?

Dr. ROBERT G. REESE explained that of all the typical forms of conjunctivitis only trachoma and the inclusion blennorrhoea could be transferred to monkeys. Lindner had proved conclusively by his experiments that Prowazek's inclusions are the cause of trachoma. So-called acute trachoma is in all probability a mixed infection. He had never seen pannus develop in a case of "sago grain" variety of trachoma, unless it was operated upon. Careful expression of the follicles, if exuberant, might materially facilitate the cure.

Dr. H. W. WOORON stated that the conjunctival affections of N. Y. school children could be clinically classified under five headings:



(1) Folliculosis, where the follicles are scattered over an otherwise normal conjunctiva, without causing hypertrophy, the blood-vessels being visible between the elevations.

(2) Follicular conjunctivitis, in which a watery or mucoid secretion is added to the first named symptoms.

(3) Papillary conjunctivitis, where the conjunctiva is distinctly thickened, the blood-vessels being partly or wholly invisible. Secretion is always present. The surface is red, velvety, and uneven. In this class the so-called trachoma bodies are always found.

(4) Cases presenting scar tissue in the lids, with or without pannus.

(5) Conjunctivitis of the ordinary types.

The first two classes never terminate in cicatrization and corneal involvement; the third class usually clears up with or without treatment after a number of months. The fourth class, however, he would call trachoma, although he did not know what appearance they presented before cicatrization took place. The fifth class required no particular description.

He was certain that folliculosis by itself never terminated in cicatrization, but in some cases the operation of expression was followed by cicatrization and corneal involvement.

Dr. WHITE stated that his experience had been mostly with Indians in the West. He thinks that acute trachoma is due to a superadded infection, that typical trachoma affects the tarsus, and that the genuine affection always leaves some evidence behind on the conjunctiva. He also found eosinophilia in follicular trachoma.

Dr. FRANCIS VALK asked if granular conjunctivitis had been observed unilaterally.

Dr. VON SHOLLY described the way in which the clinical work was carried on in the Ophthalmia School.

Dr. WILLIAMS, in answer to questions, told Dr. Weeks that the pneumococcus had been found comparatively frequently, and the Morax-Axenfeld bacillus infrequently.

In answer to Dr. Knapp, Dr. Williams called attention to the fact that the "Prowazek or trachoma inclusions" had been found in a few acute cases of contagious conjunctivitis. The reasons probably were (1) that both the epithelial cells and leucocytes react more quickly to a recent infection, helping to

produce antibodies for the bacteria, and (2) that the silver preparations these cases receive help quickly to lessen the number of bacteria.

MEETING OF MAY 19, 1913. DR. J. R. SHANNON, PRESIDENT, IN THE CHAIR.

Dr. WALTER E. LAMBERT presented **two foreign bodies**, one removed from the vitreous after having been in the eye for ten years. It was embedded in the remains of the lens and some exudate, which had to be removed by linear extraction, after which the foreign body was withdrawn by means of the small magnet.

In the second case, the patient had been struck by a wooden gate. About a week after the accident, there was a linear scar from the upper margin of the orbit to about one half inch below the inner canthus. Epiphora was the only symptom complained of, and as this seemed to be due to the occlusion of the canaliculus resulting from the wound, it was reopened and probes were passed. This relieved the epiphora somewhat, but a persistent conjunctivitis followed, with a formation of granuloma in the inner cul-de-sac. On removing the granuloma and probing, a sensation of contact with a roughened surface was experienced. The X-ray showed the presence of a foreign body which could not be removed through the original opening through the conjunctiva, nor through an incision made below the supraorbital ridge. Forty-eight hours after, on dressing the wound, a piece of iron (exhibited) was found in the inner lower cul-de-sac. Vision had not been affected.

Dr. JOHN R. SHANNON said that, when the size, form, and position could be determined by the X-ray, the operation of choice would be removal by the anterior portion of the globe. The method to be employed would depend upon the X-ray findings.

Dr. DUANE mentioned a case in which the foreign body was seen with the ophthalmoscope to be lodged in the retina, and was removed by the magnet; twenty-five years later the eye was normal except for a traumatic cataract. In another case, a pistol shot from behind had ruptured the chorioid, causing intraocular hemorrhage, paralysis of the superior rectus, ptosis, and diplopia. The shot lodged in the orbit.

Vision after years remained fairly good. No X-ray was taken.

Dr. JOSEPH B. EMERSON had seen a case of traumatic cataract with a hole in the iris, caused by the explosion of a dynamite cartridge. X-ray examination was negative. The cataract was removed. After six weeks' observation, the eye was enucleated, as it was blind and irritable, and exudate was found containing fine particles of copper and mortar.

Dr. GEORGE S. DIXON said that exceedingly fine particles present in the globe might not be found with the coarse X-ray tube owing to the spreading of the rays. When the foreign bodies were located in the orbit and the eye was quiet, it was a mistake to remove the eye.

Dr. JOHN R. SHANNON presented a patient from whose left eye he had extracted a piece of steel, 4 x 2mm, with the Haab magnet, 36 hours after the accident. The X-ray plates disclosed the metal in the lower portion of the vitreous, 11mm from the center of the cornea. The steel left the eye through the original wound of entrance, passing through the iris and zonule. A small piece of iris prolapsed and was cut off; the lens was uninjured. Resultant vision one month after the injury:  $\frac{2}{30}$  with an astigmatic glass.

Dr. CATESBY JONES reported the case of a man who came to the New York Eye and Ear Infirmary with the history of a piece of steel having hit the eye. V.  $\frac{2}{30}$ ; R.  $\frac{2}{20}$ . There was a macula corneæ downward and outward, and a hole in the iris outward. The foreign body with few atrophic patches was seen in the extreme periphery. It had entered the eye on January 15th and was removed on April 25th. The eye was quiet when patient came to the infirmary, but later opacity and siderosis developed demanding operation. The Haab magnet brought the foreign body into the anterior chamber, and Dr. Price, performing iridectomy, removed the steel with the Johnson magnet. V.  $\frac{2}{70}$ .

Dr. H. H. TYSON presented a case of **dislocation of lachrymal glands, associated with Basedow's disease**. Young woman, 25, married, no children, had been ill for about a year, losing strength and about 38 lbs. in weight in two months. Shortly after she noticed a small tumor in each upper lid which was movable. These tumors appeared spontaneously from one

to ten times a day and could also be made to appear by rubbing the upper lids. Under treatment and rest her health improved; she has gained 17 lbs. in weight, feels stronger, and the tumors do not appear as often. The dislocation of the glands seems to have been due to the weakening of the tissues and to a lack of support from rapid absorption of orbital fat.

Dr. GEORGE W. JEAN presented a case of **lymphosarcoma of the conjunctiva**. The patient, male, 55, had noticed a thickening of the lids of his left eye for a year. Examination of the left eye: Skin surfaces of lids slightly edematous. Both lids thickened. On everting the lids, the fornices were found obliterated by an infiltrate filling up the fornices and extending to the lid margins and under the bulbar conjunctiva to within 3mm of the limbus below and at the sides, and to within 5mm of the limbus above. Over the site of the transition folds a slight sulcus marked the separation of the epibulbar from the palpebral portion of the infiltrate. At the inner canthus the mass filled up the angle and obliterated the caruncle and semilunar fold. The conjunctival surface of the infiltrate was a dark raw beefsteak color, very coarsely granular and rather hard to the touch. Eye movements nearly normal in all meridians. Nothing can be felt at the orbital margins and the eye meets no resistance when pushed back into the orbit. Eye grounds and vision normal. Examination of the right eye: At the upper margin of the upper tarsus 3 or 4 large translucent follicles on the conjunctiva, 2 large follicles on the globe near semilunar fold, and a few in the lower fornix. No posterior symblepharon. Eye otherwise normal.

Blood showed slight lymphocytosis. Wassermann negative. Salvarsan and mercurials had no effect. Tuberculin reaction negative. X-ray examination of chest showed dilated aortal arch and enlarged bronchial glands.

The upper tarsus and overlying infiltrate were resected and some of the mass below was removed. In one month the infiltrate had again recurred. A section from the left lid and a follicle from the right eye were submitted to Prof. Symmers and Dr. Riley, who diagnosed lymphosarcoma of the left eye and incipient lymphosarcoma (?) of the right eye, the condition of the latter being very difficult to determine.



This case does not represent the usual type of sarcoma of the limbus conjunctivæ nor an extension from the skin surface of the lids to the conjunctiva. It seems certain that this is a primary or at least a concomitant lymphosarcoma of the conjunctiva, which is a rare condition.

Dr. LAMBERT asked whether there was any involvement of the right eye, to which Dr. Jean replied that a tentative diagnosis of the same condition had been made.

Dr. H. W. WOOTTON presented a man, 25, upon whom he had performed **Kuhnt's external canthoplasty** for pannus 2½ years previously. Had suffered from trachoma for two years and was absolutely incapacitated by dense pannus. Canthoplasty was performed on both eyes, a pedunculated flap from the lower lid being turned into the divided canthus and stitched to the loosened ocular conjunctiva. The upper portions of each tarsal cartilage and a portion of the fornix conjunctivæ were removed. Reaction was very severe. Patient left the hospital at the end of 5 weeks with both eyes open and without any signs of irritation or pannus. These cases are so desperate that the deformity caused by the canthoplasty is of little consequence.

Dr. Wootton also presented a woman of 25, whose inferior temporal vein had been occluded for two weeks. Wassermann and urine negative; blood pressure 150. Commencing vascular degeneration in the other eye. Extending from the periphery to the disk in the affected eye, the retina was edematous along the course of the inferior temporal vein, which was overful and markedly tortuous. The superior temporal vein was also distended. The other retina vessels were normal. The disk presented a distinct neuritis and two hemorrhages were situated along the vein. Several superficial retinal exudates could be seen through the retinal edema. A few floating opacities in the vitreous. The case was as yet incomplete and the tuberculin reaction would be worked out later.

Dr. KNAPP: The second case of Dr. Wootton's is very interesting. I do not see how we can reconcile the condition as the result of a vascular sclerosis. The clinical picture, with exudation, hemorrhage, and dilated vein, suggests an infectious process, and not the result of a phlebosclerosis.

One can not but be surprised at the number of cases of retinal lesions which in the last years have been brought into relationship with tuberculosis, and in many of these the main characteristic was a lesion of the veins. I do not think because a patient appears healthy that that excludes a chronic tubercular process. Furthermore, in these cases we have with the ophthalmoscope an excellent means of observing characteristic local changes after a positive tuberculin injection given for diagnosis.

Dr. KNAPP presented a patient with **trachoma follicles in the cornea**. Just below the upper margin of the cornea there were three slightly elevated, translucent, round infiltrations situated underneath the blood-vessels of an old pannus. The patient was a woman of forty years, who had had trachoma for a number of years. She had been operated upon about five years ago, by an excision. Though the conjunctiva of the lids showed no evidences of active trachoma, she developed from time to time very severe attacks of intense blepharospasm and photophobia. Dr. Knapp thought that these attacks were due to the trachoma of the cornea and that, furthermore, this case illustrated the possibility of a trachoma of the cornea existing as the direct extension of a trachomatous process along the scleral conjunctiva.

Dr. TYSON remarked that Dr. Herman Knapp had reported a case of trachoma of the cornea.

Dr. H. W. WOOTTON had excised the conjunctiva and tarsus in a few cases where follicles of the cornea appeared after some time. Tuberculin treatment had improved some of these cases.

Dr. DIXON inquired whether trachoma bodies were demonstrable in the present case.

Dr. KNAPP, in closing the discussion, said that inclusions have been found in the corneal epithelium, but as the corneal process was so old he did not think it probable that the inclusion cells could be demonstrated.

Dr. GEORGE YOUNG presented a patient, in whom a hollow style inserted for lachrimation disappeared in the tissues. The style had not been removed for a period of three years and had sunk deeper and disappeared, followed on manipulation by swelling and redness.

Condition on admission: Apparently dacryocystitis O. S., canaliculus slit; X-ray reveals presence of foreign body.

Meller's operation. The probe touched metal and disclosed a long false passage. Forceps proved unavailing. The X-ray picture (Dr. Dixon) showed a rotation of the foreign body by  $180^{\circ}$  and impaction under dense fasciæ. The strabismus hook proved an excellent expedient. The fasciæ were severed with a scalpel and by torsion of the hook the end was rotated forward and the foreign body extracted with ease. Removal of cul-de-sac piece-meal; curettement of duct and cupola; pressure bandage. Healing well. The author emphasizes (1) the value of the X-ray pictures and the need of studying them in even apparently simple cases; (2) the difficulty of the operation, being as tricky as removing a fish-hook; (3) the need of being prepared for a general anesthesia, the process being extremely painful.

Dr. J. HERBERT CLAIBORNE presented a case of **abscission of the cornea**. Young woman gave a history of frequent attacks of phlyctenular keratitis, followed by perforations of the cornea, which caused a marked anterior staphyloma. This condition warranted the operation of abscission of the cornea with suturing of the sclera, after removal of the cornea and lens. After about two weeks a glass eye was prescribed, resulting in excellent movements of the eyeball from side to side.

Dr. TALBOT R. CHAMBERS asked whether Dr. Claiborne would perform the same operation in similar cases due to other diseases of the cornea, to which Dr. Claiborne answered in the affirmative.

Dr. W. B. WEIDLER presented a patient with **detachment of the retina and chorioid with linear rupture of the chorioid**.

Patient, 21, received a fist blow in the left eye seven years ago and was knocked to the ground.

Ophthalmoscopic examination: O. S., media clear, disk oval,  $7 \times 8$  long, axis  $90^{\circ}$ . Scleral ring all around, absorption conus all around, central excavation small. Upper and inner quadrant of fundus normal, disk slightly pale. There are two long linear tears in the chorioid, one at axis  $180^{\circ}$  nasal, and the other at  $65^{\circ}$  temporal, being fine and narrow near the disk and getting wider toward the periphery of the fundus.

Traveling forward in the lower half of the eye, the retina and the chorioid detachment are seen involving almost the complete lower half of the eye. The detachment is a flat one, and the chorio-capillaris of the chorioid is seen on apparently the same level as the detached retina. Very far forward near the ora serrata, several pearly gray areas are seen where the retina shows a detachment from the chorioid. Transillumination fails to show any shadows or obstruction of the light in any portion of the detachment. This may have been due to a subchorioid hemorrhage at the time of the blow or to some exudate. It is hardly due to a melanotic sarcoma, but it might be a leucosarcoma growing between the two layers of the chorioid.

Dr. MARK J. SCHOENBERG asked whether the field of vision was taken, to which Dr. Weidler answered in the affirmative.

Dr. KNAPP: This case seems to me to be that of a variety of retinal detachment which is characterized by a perfectly clear subretinal fluid, and where the curved margin of the detachment presents chorioidal changes and often a white line in the retina, evidently due to a fold of the retina. He did not think that this should be regarded as a case of chorioidal detachment. In his recollection, he had never seen a chorioidal detachment in which the ophthalmoscopic picture gave the reflex of the normal chorioid.

Dr. J. HERBERT CLAIBORNE reported a case of **sudden bilateral blindness following a fit of anger, with resultant permanent bilateral central (paracentral) scotoma**. Patient was a young man, 19 years old, apparently of good habits. On coming home one evening, he quarreled with his father-in-law, who was a drunkard, and next day he became suddenly blind. According to the history of the case, he never touched any liquor, showed no physical defects, and both urine and Wassermann were negative. Functional examination showed a bilateral central scotoma.

Dr. Claiborne went into the anatomy of the optic nerve fibres and of the maculo-papillary bundle of fibres in the optic nerve, chiasm, and tract. He thought that this fit of anger caused a temporary congestion or swelling of the pituitary body and thereby pressure upon the maculo-papillary bundle of fibres, resulting in a permanent pathological condition.



Dr. DUANE had had a case of recurrent spasm of the retinal artery in both eyes, causing blurred vision and a paracentral scotoma. The affection first involved one eye and then the other. The arteries were contracted and the veins became dilated with amyl nitrite. It occurred after a fit of excitement.

Dr. SCHOENBERG believed that Dr. Claiborne had not proved the point to the entire satisfaction of scientific accuracy. The pituitary gland had a very intimate connection with many parts of the organism, and a sudden swelling of it ought to have produced a series of disturbances traceable to that gland. If Dr. Claiborne had presented the results of investigations of this kind, showing by the blood pressure, carbohydrate tolerance, blood and urine examinations, etc., that there were changes present suggesting an acute disturbance of the hypophysis, he would have worked out a classical first case on record.

Dr. TYSON inquired whether Dr. Claiborne could positively exclude toxic substances as a cause, as the description of the fundus given by him was quite typical of the cases produced by wood alcohol, and the symptoms were quite similar.

Dr. CLAIBORNE answered that toxic substances as a cause had been excluded.

REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE ROYAL  
SOCIETY OF MEDICINE.

By MR. C. DEVEREUX MARSHALL, F.R.C.S., LONDON.

CLINICAL MEETING, WEDNESDAY, MAY 7, 1913. SIR ANDERSON CRITCHETT,  
BART., C.V.O., PRESIDENT OF THE SECTION, IN THE CHAIR.

Mr. N. BISHOP HARMAN showed a case of **exenteration of the orbit**, with partial excision of the maxilla and ethmoid for rodent ulcer. The woman had first seen the rodent ulcer seventeen years ago, and she treated it herself with caustics. It frequently recurred, and nine years later was as large as a farthing. She then had X-rays at every recurrence for four years. Next, zinc ions were used, followed by radium for nine months. When sent to him for operation, the ulcer was as large as a penny, and was fixed to the bone. Ultimately, an extensive operation had to be performed, and the growth was found to have extended into the orbit and the bony walls. Mr. Harman said none of the newer measures for the treatment of rodent ulcer could compare with the knife for certainty and security, and the knife was infinitely less costly than any other method. Had this growth been excised in the first instance, the woman would have escaped the necessity for this severe operation, and would have preserved to herself two sound eyes.

Mr. HARMAN also showed drawings of a case of **extreme hyperphoria**, for which he had operated by his new method of subconjunctival reefing. The patient, a woman æt. 28, had

been a martyr to severe headaches since school days, and could obtain no relief from them. Examination of the eyes revealed hyperphoria or latent vertical squint, requiring a  $15^{\circ}$  prism to correct. It was impracticable to wear such a high degree prism. Concluding from other signs in the case that the left superior rectus was at fault, he operated, shortening that tendon by his new method. She had now orthophoria to every test, and the headaches had completely ceased. Seven months had elapsed since the operation, and the result was perfect in every way.

Mr. EDGAR CHATTERTON showed a case of **tuberculous iritis in both eyes**. The boy noticed that his sight was bad when at school thirteen months ago. He had never had pain, and there was no history of tubercle or syphilis. Two months ago he had yellow vascular nodules in both irides at the angle of the anterior chamber, posterior synechiæ, keratitis punctata, and vitreous opacities. He was now having tuberculin injections  $\frac{1}{1000}$  of a *mg.* once a week, and frequent tapings of the aqueous. The condition had improved on that treatment.

Mr. SYDNEY STEPHENSON showed a case of **ocular torticollis** in a boy æt.  $13\frac{1}{2}$ . At three months of age, when recovering from whooping-cough, he held his head towards the left shoulder, and that habit had persisted. While he was in the wry-neck posture there was no squint or diplopia. But when he straightened his head the right eye turned upwards and outwards, and vertical and contortional diplopia developed.

Mr. G. H. POOLEY and Mr. HAROLD GRIMSDALE showed cases of **angioma of retina**, and Mr. Pooley also exhibited a case of **giant-celled sarcoma**, in which there had been several operations for recurrences, the last in November, 1911, since which date there had been no further appearance of the disease. The President commented on the present procedures as a great advance on the days of removal followed by the application of caustic zinc paste to the remaining surface of the wound.

Mr. H. HERBERT showed a case of **third nerve paralysis with rhythmic clonic spasm**. In this case no divergence was to be seen, but there was the same absence of strabismus

as in congenital paralysis of the sixth nerve. The synchronous raising of the lid to the normal extent was due to spasm of the unstripped levator muscle, which was innervated by the sympathetic.

Mr. H. J. FISHER exhibited a case showing **arterio-venous communication in the cavernous sinus**, successfully treated by ligature of the common carotid. Mr. Elmore Brewerton, discussing the case, pointed out the reason why the internal carotid should be tied in preference to the common carotid, and said he thought that measure would be followed by more cures, and less cerebral complications.

Mr. ERNEST CLARKE presented a case showing an **unusual arrangement of opaque nerve fibres**. The patient was a myopic youth æt. 20. There was a peculiar ring round the disk, bulging forward, giving to the disk a crater-like appearance. Opaque nerve fibers spread from all parts, and partly involved the macula.

Mr. R. CRUISE showed three instances of **trephining combined with insertion of thread in glaucoma**, the object of this being to increase the area after trephining. The aqueous filtered along the course of the thread, and did not cause inconvenience. He explained that the procedure was on its trial. The President said one of the cases shown he sent to Mr. Cruise for treatment, expecting that enucleation would have to be performed, but from T+3 the tension was now found to be normal or even sub-normal, and the pain had gone.

Mr. RICHARDSON CROSS (Bristol) showed a **pigmented growth of the conjunctiva**. The general impression was that free excision, followed by the galvano-cautery to the residue, should be done.

The ordinary meeting of the Section was held on Wednesday, 4th of June, under the presidency of Sir Anderson Critchett, Bart., C.V.O.

Mr. COLE MARSHALL showed a case of **uncommon type of cataract** in a child. Mr. BISHOP HARMAN brought forward a case of **melanotic growth**, which seemed to originate in the iris. Mr. JESSOP inclined to the view that it sprang from the ciliary body, and pushed the iris on one side, causing flattening of



the edge of the pupil. He agreed that it was a melanotic sarcoma. Mr. TREACER COLLINS mentioned a case of melanoma of the iris, malignant characters having arisen later. He agreed with Mr. Jessop that in the present case the origin of the growth was probably the ciliary body. A possibility in Mr. Harman's case was that it was a cyst, such as Mr. Coats described, with agglutination of the ciliary processes.

Mr. BISHOP HARMAN also showed a case of **spontaneous recovery from detachment of the retina**. The patient had had complete detachment for three months, and during it she was in bed three times; she refused operation. Shortly after that date the sight suddenly came back, and now there was no trace of any detachment; all that could be seen were one or two cobwebby lines in the disk. She had  $\frac{6}{8}$  one-letter vision. She had 10 D of myopia, but there had been no accident of any kind. She was a cook in a good family, and one February night she walked out from a hot room to the cold air, and her description was that something black suddenly fell over her eye, and she could not see anything more with it.

Mr. GOUDIE described the case of a child which came to Glasgow Eye Infirmary with detached retina, and in whom three months later the retina became re-attached. Two months afterwards it again became detached, only to again become attached. There was fair vision, and no iritis.

Mr. RAYNER BATTEN said he had a case with nearly 20 dioptres of myopia and detachment. Detachment occurred also in the other eye, and the patient was so blind for a year or two that she had to be led about. Later she came and said she saw a glimmer of light and from that date her sight began to return; she accepted her lenses again, and was able to find her way about. He believed her vision was  $\frac{6}{4}$ .

Mr. HERBERT PARSONS said he, like others, was sceptical about spontaneous recovery from detachment being possible, until he had a case which altered his view. It occurred in hospital, and though a little later the patient was very carefully examined, no trace of the detachment could be detected, not even streaks to mark what had occurred; eighteen months later, however, he came with a relapse.

Mr. MACNAB described a case of double detachment which

underwent spontaneous cure. In another case in which the condition occurred there had been irido-cyclitis, and he believed it was due to tubercle of the eye; there was a large vitreous opacity, and very extensive detachment; the eye was very soft, being practically devoid of tension; the cornea could be seen to be dull and crinkled. Vision was reduced to mere perception of light. He gave tuberculin, and a vaccine cultivated from the patient's own coli bacilli. For four months now the tension had been normal, and the patient could count fingers at 5 or 6 metres.

Mr. JESSOP reminded the meeting that when the Ophthalmological Society discussed the subject only one case was reported as having been cured, and that was spoken to by Mr. Nettleship and Sir John Tweedy. Many cases of cure of the condition had been reported, but they had not been lasting.

Mr. ORMOND did not share Mr. Jessop's scepticism, and described a case of his own, in a patient who had been treated by glasses for high myopia, and a little later she said her vision suddenly went in one eye. She had obvious detachment of the outer side of the retina. He did a sclero-puncture, and removed some fluid, and in three days the detachment had disappeared. He had seen her a number of times since, and the attachment remained absolute. Vision was  $\frac{6}{36}$ .

Mr. LESLIE PATON reminded the meeting that Mr. Harman's case was one of spontaneous re-attachment, not after operation. He was more optimistic than Mr. Jessop on the subject. He had seen a case of 35 years' standing cured after operation, though it was a double case. In another case, that of a lady with 15 D of myopia, and vision  $\frac{6}{18}$  in either eye, there was detachment in one eye, resulting in blindness, and that was followed by detachment in the other eye. After operation, her vision was better than before the detachment. In the case of a girl with detachment, she was put on her back and treated with mercury and iodide, and in three months the retina had become re-attached, leaving only a curious distribution of retinal pigment. In a series of 28 cases of detachment which he had looked up, 7 were cured.

Mr. NETTLESHIP and Mr. JESSOP suggested that in the

near future a further discussion on the subject should be held by the Section. Mr. Nettleship said he had records in his case-books of several cases of detachment which had recovered.

Mr. CUNNINGHAM showed a case of **nystagmus with uniocular fixation**.

Professor WORTHINGTON, F.R.S., gave a contribution and demonstration on **An experimental study of normal monocular polyopia**.

Mr. G. H. POOLEY showed a case of **cyst of the iris** and Mr. GOUDIE a case of **corneal ulceration**, the discharge from which contained fusiform bacilli and spirillæ resembling those found in Vincent's angina. Dr. FREELAND FERGUS presented a communication entitled **Glaucoma associated with venous congestion**.

Mr. BISHOP HARMAN submitted a paper on **The education of high myopes**, the experience of four years. It was an account of the working of a scheme for the safe education of children with such a degree of myopia that they were not fit for the ordinary school curriculum, yet were not bad enough to require the teaching for the blind. In any scheme of compulsory education, there must be provision for misfits, and for none was this more necessary than for high myopes, who often had great intelligence and hence were in danger of damaging their delicate eyes by over-application. He explained the method of selection of cases and their transfer to centers for special instruction. The curriculum fell into three parts: (1) oral, the children being associated with scholars of the ordinary school for subjects which could be taught orally; (2) literary work, which was learned not by books, pens, or paper, but by blackboard and chalk, the writing to be done free-arm fashion; (3) a full use of the handicrafts which would develop attention and concentration with a minimum use of the eyes. His conclusion was that a suitable system of teaching myopes could be arranged and satisfactorily carried out. Such classes should not be independent units, nor be associated with existing blind schools, but should be integral parts of existing elementary schools. Their success depended almost wholly on the intelligence and initiative of the teachers, who were required to do real teaching. The training of these children should be general, not merely technical. The classes

should be of small size, with an optimum number of a dozen per teacher, and there should be a standard of visual acuity of  $\frac{6}{18}$  with suitable glasses. The children should also be under regular medical supervision during the whole of their school life.



## QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUTLER, Dresden; and VISSER, Amsterdam.

### THIRD QUARTER, 1912 (*Concluded*)

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

#### XXII.—OPTIC NERVE AND VISUAL TRACT. Reviewed by MEYER.

411. MOISONNIER. Optic neuritis of gouty origin. *La clinique ophtalmologique*, iv., p. 414.

412. SIEGRIST. Choked disk and its operative treatment. *Korrespondenzblatt f. Schweizer Aerzte*, xlii., p. 521.

413. VOLLERT. Three cases of extreme choked disk after injections of salvarsan for syphilis. *Muench. med. Wochenschr.*, p. 1690.

414. ZANI e DEL LAGO. Infantilisimus from a tumor of the hypophysis. *Annali di Ottalmologia*, fasc. 7, 1912.

MOISONNIER (411, Optic neuritis of gouty origin) observed a bilateral retrobulbar neuritis in a very corpulent man 43 years old, who had suffered from a number of typical attacks of gout in the course of some years. The visual disturbance set in quite suddenly, within a few hours, first in one eye and a week later in the other; it consisted in each eye of an oval central scotoma of from 15° to 20° in extent. Local treatment consisted of subconjunctival injections, general treatment of purgatives, regulation of the diet, bleeding salicylic acid, and colchicum. Complete recovery took place within four weeks. He believes this to have been a true toxic disease of the optic

nerve induced by the still unknown toxine that acts in the attack of gout.

SIEGRIST (412, **Choked disk and its operative treatment**) gives his personal experiences in the palliative treatment of choked disk. Of the various theories which have been advanced to account for the origin of choked disk he considers the one brought forward by Schieck to possess the greatest degree of probability. When syphilis is the cause he recommends lumbar puncture in addition to mercurial inunctions. An intervention is naturally first to be made when the vision falls. If a positive diagnosis of tumor has been made no time should be lost after puncture of the spinal cord, but a trephining should be done quickly. When the tumor cannot be accurately localized, the right parietal bone should be trephined, because the injury will be least at this place.

VOLLERT (413, **Choked disk after salvarsan**) observed three cases in which papillitis appeared a short time after an injection of salvarsan had been given. He believes that such affections are more frequent after the use of salvarsan than they were when mercury was the only remedy employed; hence he recommends to limit the use of salvarsan and to always try inunctions with mercury first.

The patient of ZANI E DEL LAGOS (414, **Infantilismus from tumor of the hypophysis**) had total blindness of the right eye with atrophy of the papilla, and temporal hemianopsia of the left eye with paleness of the nasal side of the papilla. The right optic tract and the inner part of the left were destroyed as the result of a fracture of the sella turcica, as determined by radiography. The tumor of the hypophysis, which appeared shortly before puberty, was accompanied by headache, tinnitus aurium, dizziness, nausea and vomiting, and by a sudden inhibition of development.

XXIII.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.  
Reviewed by MEYER.

415. V. HIPPEL. **Extraction of bits of copper from the vitreous chamber.** *Klin. Monatsbl. f. Augenheilkunde*, July, p. 52.

416. NATANSON. **A case of evulsio nervi optici.** *Ibid.*, August, p. 220.

417. ODINZOFF, W. **Siderosis of the eye.** *Westn. Ophth.*, July, 1912.

418. PICHLER, A. **Rupture of the chorioid as the probable cause of a high myopia.** *Klin. Monatsbl. f. Augenheilkunde*, September, p. 342.

V. HIPPEL (415, **Extraction of bits of copper from the vitreous**) advises that the extraction of bits of copper should be undertaken as early as possible after the accident. He has operated on 15 cases, on 7 with success, in so far as the eyeball was preserved. The vision in 5 of these was  $\frac{5}{35}$ ,  $\frac{1}{25}$ ,  $\frac{5}{15}$ ,  $\frac{5}{20}$ , and  $\frac{5}{7}$ , in 2 it was perception of light and good projection. All of the eyes saved are free from irritation and have normal tension. The period of observation is too short as yet to enable it to be determined whether the preservation of vision is permanent or not.

NATANSON (416, **Evulsio nervi optici**) describes a case of injury that he observed. The absence of the papilla with its vessels, the hole in the place where this should have been, which was surrounded by a margin formed of a scleral ring and a zone bared of the retina, the ending of the retinal vessels at the edge of this zone, and the amaurosis that immediately followed the injury form the basis for the diagnosis *evulsio nervi optici*.

The diagnosis made in the patient of ODINZOFF (417, **Siderosis of the eye**), 43 years old, was: O. D., *synechiæ posteriores*; O. S., *atresia pupillæ*, *glaucoma consecutivum*. The left eye had been diseased for a year and a half. The conditions when the patient came under observation were: O. S., injection; cornea clear; anterior chamber shallow; color of the iris changed; capsular cataract; vision zero; eyeball tender to pressure. O. D., Slight injection; posterior *synechiæ*; opacity of the vitreous; vision  $\frac{1}{1000}$ . The left eye was enucleated. Four months later the condition of the right eye was: *occlusio pupillæ*; vision  $\frac{1}{8}$ . Examination of the enucleated eye revealed atrophy of the iris, of the ciliary body, and of almost the entire sphincter; the pupil occluded; chronic proliferating inflammation of the vessels; degeneration of the retina; glaucomatous excavation of the papilla; cortical and capsular cataract; siderosis of the cornea, iris, lens, and *pars ciliaris retinæ*; occlusion of the sinus of the anterior chamber; degenerative and proliferative changes in the pigment epithelium. The presence of iron in the tissues of the eye corresponded exactly with the description of siderosis made by v. Hippel. No granules of iron pigment could be discovered in the conjunctival cells that covered the

cornea and iris. The neuro-epithelium was greatly changed, as was also the pigment epithelium. At the periphery of the retina the rods and cones were completely wanting, the cells of the pigment epithelium were proliferated into the retina. At the posterior pole the signs of degeneration were less marked. Apparently the changes in the pigment epithelium depend on the disappearance of the neuro-epithelium, just as in retinitis pigmentosa, and only secondarily on the presence of iron. When the piece of iron penetrates only into the anterior part of the eye, a siderosis very rarely develops; it usually gives rise to a cataract. V. POPPEN.

PICHLER (418, **Rupture of the chorioid as the probable cause of a high myopia**) describes the onset of a myopia of 14 D. in a patient after a contusion. The refraction of the other eye was +1.0 D. The ophthalmoscopic condition of the myopic eye was peculiar. The papilla was transversely oval and surrounded by a ring of pigment which was particularly broad and marked above and below. The impression given by the condition as a whole was that a compression and consequent rupture of the fundus of the eyeball had taken place under the influence of an external force, and to this the writer ascribes the origin of the myopia.

#### FOURTH QUARTER, 1912.

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

#### I.—GENERAL OPHTHALMOLOGICAL LITERATURE (BOOKS, MONOGRAPHS, HISTORICAL ESSAYS).

Reviewed by WESSELY.

419. AXENFELD. *Textbook of Ophthalmology*. Third edition.

420. ROEMER. *Textbook of Ophthalmology in the Form of Clinical Lectures*. Second revised edition.

For the review of AXENFELD'S **Lehrbuch der Augenheilkunde** (419) see the March number of the ARCHIVES, Book Reviews, page 221.

Nothing of the prolixity that marked ROEMER'S first edition (420, **Textbook of Ophthalmology**), is to be found in the second, so that although its contents have been enriched it has been considerably reduced in size, and made clearer and handier.



II.—RELATIONS OF OPHTHALMIC TO GENERAL DISEASES, INCLUDING POISONS. Reviewed by KOELLNER.

421. BAHN, O. A. The moving picture and the eye. *New Orleans Med. and Surg. Jour.*, Oct., 1912.
422. BOSSIDY, J. C. A case of uniocular polyopia existing in both eyes. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.
423. BOURLAND. Two cases of optic neuritis due to malaria. *Annales d'oculistique*, cxlviii., page 362.
424. CALHOUN, F. P. Eye complications caused by hookworm disease. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.
425. FRIEDMAN, L. Temporary toxic amaurosis and paralysis following injection of ethyl alcohol into a chronic empyema sinus. *Ibid.*, Nov. 13, 1912.
426. GIFFORD, H. A case of the juvenile form of family amaurotic idiocy. *Ophthalmic Record*, Nov., 1912.
427. HEINE. Tuberculosis and tuberculin. *Med. Klinik*, No. 44-45.
428. KASASS, J. J. Pathology of methyl-alcohol amaurosis. *Diss.*, St. Petersburg, 1912.
429. LIÉGARD and OFFRET. Wassermann's reaction in interstitial keratitis, irido-chorioiditis, oculomotor paresis, and optic atrophy. *Annales d'oculistique*, cxlviii., p. 422.
430. POLET. Ocular troubles following affections of the teeth. *Annales belge de stomatologie*, Nov., 1912.
431. STRAUB. An ophthalmological contribution to the doctrine of scrofulosis. *Ophthalmoscope*, Nov., 1912.
432. TYSON, H. Amblyopia from inhalation of methyl-alcohol. *Trans. Amer. Ophthal. Society*, 1912.
433. ULBRICH. Demonstration of a patient with a high degree of lipæmia. *Wien. ophthalm. Ges.*, 1912.
434. WOLTON, C. B. A case of quinine amblyopia. *Annals of Ophthalm.*, Oct., 1912.
435. WOLTON, C. B. Hemorrhage as the cause of blindness. *Illinois Med. Journal*, Nov., 1912.
436. WOOD, C. A. Nasal hydrorrhea. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.
437. ZENTMAYER, WILLIAM. Visual disturbance from distant hemorrhage. *Ibid.*, Sept. 21, 1912.

BAHN (421, The moving picture and the eye) has found injection of the lids, lachrymation, retinal fatigue, pains in the eyes, headaches, muscæ volitantes, and dizziness in patients who had been watching moving pictures. He believes that the moving picture is a decided strain upon the eyes, especially if any refractive or muscular error is present.

ALLING.

BOSSIDY's (422, Uniocular polyopia in both eyes) patient

was a girl of 14, who had perfect vision with correction for myopic astigmatism. The ocular muscles were paretic. A cycloplegic did not eliminate the diplopia. Later she said that she saw four objects with each eye. The polyopia was evidently of hysterical origin.

ALLING.

WOOD (436, **Nasal hydrorrhea**) thinks that nasal hydrorrhea is a symptom and not a disease. In the majority of cases there is optic atrophy. He believes the discharge to be cerebro-spinal fluid. The underlying cerebral disease is frequently hydrocephalus, and the increased pressure gives rise to seepage of fluid through one or more nasal openings.

ALLING.

GIFFORD (426, **Juvenile form of family amaurotic idiocy**) recites the case of a girl who, at the age of 7, began to fail in mental condition and to lose her sight. When examined she was 11, and was abnormally quiet and childish. There was eccentric fixation, but sufficient vision to enable her to find her way about. Divergent strabismus and slight nystagmus were present, and there were dust-like opacities in the vitreous. The nerves were atrophic. Masses of pigment that resembled, but were larger than, those of retinitis pigmentosa could be seen. Four years later the child died totally blind in a hospital for the incurable insane. An older brother had a similar history. Five other children in the family were healthy. He also speaks of four children in another family who developed normally up to the age of 7 or 8, and then were obliged to drop out of school on account of failing vision and lack of mental ability. Similar cases are well known and have been reported by Batten, Mayou, Vogt, Oatman, and others. Most observers agree that these cases are allied to the infantile form of family idiocy. The pathological condition of the brain is essentially a degeneration of the ganglion cells. There have been only three microscopical examinations, and they showed complete degeneration of the rods and cones as well as of other layers of the retina, thus differing from the infantile form, in which the rods and cones are found to be normal.

ALLING.

HEINE (427, **Tuberculosis and tuberculin**) divides the clinical picture of tuberculosis of the eye into the typical and

the atypical forms, the latter including those cases in which the cause may be tuberculosis in the absence of other etiology, while the former comprises those that are produced only by this disease. Among the former are included certain forms of little gray nodules in the region of the circulus iridis minor and the margin of the pupil, which can be mistaken for nothing else. Among the atypical forms are certain varieties of parenchymatous keratitis. With regard to the general reaction to old tuberculin, he lays less stress on the size of the dose than on the question whether there is any reaction. According to his experience there is no sense in going higher than 5mg in children, or 10mg in adults. If the patient does not react to this he will not to larger doses, or to the bacillus emulsion. His view concerning the local reaction in the eye is that its absence proves nothing against the tuberculous etiology of the affection present; it may not be present in clinically positive cases of tuberculosis of the iris. Besides the well-known positive local reaction there is a "negative" pallor reaction, which is more frequent in scrofulous, and less common in purely tuberculous, affections. It may appear either together with the positive reaction, or independently.

STRAUB (431, **Ophthalmological contribution to the doctrine of scrofulosis**) says that latent tuberculosis is to be considered the morphological substratum of scrofulosis. Infection in early youth can be overcome, but there remain behind swollen glands which contain living bacilli and necrotic tissue. The absorption of the poison produced by these, causes an intoxication which is disturbing to health, and if tuberculous matter enters the blood, benign metastatic foci in other parts of the body may result. The primary focus has both a bad and a good influence. Although it has provoked the metastatic tuberculosis, it has modified it by giving to the tissues an increased resistance.

GROUT.

LIÉGARD and OFFRET (429, **Wassermann's reaction in interstitial keratitis, irido-chorioiditis, oculomotor paresis, and optic atrophy**) summarize their studies of Wassermann's reaction in 167 patients with syphilitic affections of the eye with the statement that a positive reaction is of extreme value for the diagnosis of syphilis, but that a negative result is of only

limited value. The difference in the results obtained in interstitial keratitis and irido-chorioiditis is very striking; a high percentage of positive reactions was obtained in the former, while the great number of negative results in the latter seem to justify the statements of many writers that syphilis is less often the cause of diseases of the uvea. The exact figures are: 80% positive Wassermann in interstitial keratitis, a figure that rises still higher when all old cases that have previously been treated are excluded; in the category of doubtful cases the large number of positive serum diagnoses (66%) is of special importance. The reaction was positive in 27% of the cases of irido-chorioiditis; it was positive in 69% of the cases of probable or certain syphilis, and in 16% of the cases in which there was no clinical evidence of the disease. A positive result was obtained in 55% of the cases of optic atrophy and paresis of the ocular muscles. Only one negative result was obtained in the cases of manifest tabes, while only 20% were positive in those in which the Argyll Robertson pupil was absent.

CAUSÉ.

It has long been known that hookworm disease is often associated with anæmia and œdema of the retina and disk, and with retinal hemorrhages. CALHOUN (424, **Eye complications caused by hookworm disease**) mentions a number of cases of cataract which he thinks were due to the toxins which are generated by the hookworm and cause derangement of the nutrition of the lens.

ALLING.

BOURLAND (423, **Optic neuritis due to malaria**) reports two cases of optic neuritis caused by malaria, each of which ran an exceptionally bad course. The first patient was a soldier of the Foreign Legion, 35 years old, who complained of impairment of vision in each of six attacks of malaria, and finally lost a great part of his vision and had atrophic papillæ. The disease ran a similar course in the other patient, an Arab, 30 years old, who had suffered from many attacks. Bourland thinks that more attention should be paid to the condition of the eyes in malaria than is customary, as the papillitis can then be seen in its early stage and suitable measures can be taken to combat it. It is not as benign in all cases as it has been supposed to be.

CAUSÉ.



ULBRICH (433, *Lipæmia*) had a patient, 29 years old, with a high degree of lipæmia. The eyes were externally normal, the media clear, the vision and visual fields normal. In the fundus the arteries appeared to be pale reddish, the veins pale violet, on a red background. The white coloring extended into the finest twigs. On the papilla some of the veins were broad and sheathed with white; no light streak was visible on the veins, on the arteries it was very narrow. The interspaces between the vessels were marbled. The fundus was of its ordinary red color; the macula was of a lively red. The patient was suffering from a grave attack of diabetes. Lipæmia occurs in severe cases of diabetes and is characterized by the appearance of a great quantity of fat and fatty substances in the blood. This is the eleventh reported case, but did not present the highest degree, as the vessels were not quite white. The prognosis is very serious because of the basal disease. Anatomically the vessels are perfectly normal. The minute red lines which border the white vessels are probably due to contrast or shadows; they are not due to diapedesis of blood corpuscles into the adventitia. The veins are without reflexes, probably they are flattened. The reflex from the arteries is narrow; it may be because it comes from the surface of the blood column, while the normal, broad arterial reflex comes from the axial current. The red color of the fundus does not come from that of the chorioidal vessels, but from the pigment epithelium.

In the discussion Lauber remarked that Marx has shown that the light reflected from the fundus corresponds to the spectrum of the pigment epithelium and not to that of the blood.

TERTSCH.

According to ZENTMAYER (437, *Visual disturbances from distant hemorrhage*), visual disturbances occur more frequently in the female, and between the ages of 20 and 50. Usually they appear immediately or within a few hours after the loss of blood. Both eyes were affected in 88%. Optic neuritis, papilloedema, and optic atrophy occur, as well as œdema of and hemorrhages into the retina. He points out the fact that some underlying disease with tissue changes is probably present in the majority of cases. He thinks that retinal ischæmia with

degeneration of the ganglion cells is the most plausible explanation for those cases which exhibit peripheral field contraction, retrobulbar neuritis for those with central scotoma, central lesions for those with hemianopsia, and simple atrophy and postneuritic atrophy for those with marked superior and inferior contractions of the fields. The injection of blood serum in those cases in which blindness is not immediate seems to be the rational treatment. He relates two cases and gives those from literature.

ALLING.

WOLTON (435, **Hemorrhage as the cause of blindness**) relates the case of a man of 58 who vomited a considerable quantity of blood at different times, becoming unconscious after the last attack. It was then found that he had become blind, a condition in which he remained for two weeks. Atrophy of the iris, small, sluggish pupils, and atrophy of both nerves were found. The vision was R.  $\frac{10}{80}$ , L.  $\frac{3}{20}$ . General examination revealed myocarditis and general arterio-sclerosis.

ALLING.

KASASS (428, **Pathology of methyl-alcohol amaurosis**) studied the effects produced on the eye by methyl-alcohol poisoning in 40 rabbits. From 2.5 to 6ccm to the kilo of the weight of the animal of a 30% solution of methyl alcohol were introduced into the stomachs through a tube. The animals lived comparatively long, one was killed on the 268th day. Specially marked changes were found in the retina, optic nerve, and chorioid. In the retina the changes were to be found in all of the layers, but were most marked in the layer of ganglion cells, where all stages of degeneration could be seen up to total disappearance of the cells, with in many cases a well marked confluence of the granular layers. The retina was very oedematous, and showed a fatty degeneration in the layer of nerve fibers. In two cases the picture seen on microscopic examination was exactly that of an albuminuric retinitis. The fibers of the optic nerve likewise had undergone fatty degeneration, and in addition an interstitial and parenchymatous neuritis was present. Many hemorrhages were to be seen in the membranes of the optic nerve. A fatty degeneration was also found in the oculomotor and sciatic nerves, as well as in the chiasm. The first changes could be observed

in the retina and optic nerve twenty-four hours after the introduction of the alcohol. The construction of the chorioid was so changed as to be unrecognizable. Considerable hemorrhages were present in 14 out of 15 cases, and in 2 there was a detachment of the retina in addition.

The author advances the following theory of the pathogenesis: Under the toxic influence of the methyl alcohol, hemorrhages take place in the envelope of the optic nerve and the chorioid, which have a decided influence upon the circulation of the blood and produce anæmia; the presence of formic acid, a product of the imperfect combustion of the methyl alcohol in the vessels, causes a fatty degeneration. These two factors together with the œdema cause a disturbance in the function of the nerve. These, together with a degeneration of the retina, lead to a rapid amaurosis. As soon as the collateral circulation is established, the œdema passes away and vision is partially restored. The second and final loss of vision is due to a permanent atrophy. The central scotoma is caused by an axial neuritis, the contraction of the visual field by the involvement of the peripheral layers of the optic nerve in the process. He concludes that the optic neuritis may have a parenchymatous and interstitial character, and that, to judge from the entire symptom-complex, the epidemic of poisoning in Berlin in Dec., 1911, is not to be ascribed to a methyl-alcohol poisoning.

V. POPPEN.

According to TYSON (432, **Amblyopia from inhalation of methyl alcohol**), thirteen cases of this form of poisoning have been reported. He relates the case of a man who was employed to shellac the interior of beer vats. He always wore gloves. His vision failed to counting fingers in the peripheral field. Optic neuritis and retinal œdema were present. Under treatment he later recovered central vision with contracted fields and atrophic nerves. Two additional cases occurred in women using varnish made from wood alcohol. They complained of headache, dizziness, and obscurations. Their optic disks were blurred and the veins dilated. The symptoms appeared after working in a closed room for a few hours. Tyson believes that denatured alcohol should be substituted for wood alcohol in the arts and trades.

ALLING.

FRIEDMAN (425, **Temporary toxic amaurosis and paralysis following injection of ethyl alcohol into a chronic empyema sinus**) injected 25cc of pure alcohol into a sinus connected with a bronchus; his patient immediately became unconscious and later lost his vision, except for light perception, for about an hour. Paresis of the upper and lower extremities was also present. No ophthalmoscopic changes were noted.

ALLING.

WOLTON'S (434, **Quinine amblyopia**) case was an alcoholic who took within four hours 55 grains of quinine and a quart of whiskey. The disks showed atrophy and the vessels were greatly narrowed. The visual fields were contracted for form and color.

ALLING.

POLET (430, **Ocular troubles following affections of the teeth**) finds that infections and inflammations which extend from the teeth to the maxilla may spread to the eye along the veins or nerves by the bony or subperiosteal route. During the first and second dentitions such affections are observed as kerato-conjunctivitis, lachrymation, and spasm of the facial nerve, but these troubles are still more frequent at the time of the cutting of the wisdom teeth. With dental caries have been observed: amblyopia with contraction of the peripheral portion of the visual field, mydriasis, meiosis, disturbances of accommodation, orbital neuralgias, oculomotor paresis, blepharospasm, keratitis, iritis, chorioiditis, and increase of tension. In the course of periostitis may appear: orbital cellulitis, sinusitis, embolism of the retinal vessels, abscess of the frontal lobes with coincident optic atrophy.

DANIS.

### III.—GENERAL AND EXPERIMENTAL PATHOLOGY AND TREATMENT. Reviewed by LOEHLEIN.

438. BORBERG, M. C. **Adrenalin and its test.** *Skandinavisches Arch. f. Physiolog.*, xxvii., Nos. 4, 5, and 6.

439. MAYOU, S. **Serum and vaccine therapy in connection with diseases of the eye.** *Annals of Ophthalmology*, October, 1912.

440. MORGENROTH and GINSBERG. **The action of the cinchona alkaloid upon the cornea.** *Berl. klin. Wochenschrift*, 1912, p. 2183.

441. SIMON, J. **The after-effects of neosalvarsan.** *Muench. med. Wochenschrift*, No. 43.



BORBERG (438, **Adrenalin and its test**) describes the numerous chemical (colorimetric) tests for adrenalin, and finds, contrary to the statements of some writers, that adrenalin can be detected with certainty in a dilution of 1:300,000, but not in greater dilutions. This observation, together with the fact that in all of these color reactions the red stain is the same as that produced by the addition of a few drops of ordinary water, or the exposure of a solution of adrenalin to light and air, causes him to think that essentially the same process takes place in all these procedures—namely, the oxidation of the adrenalin and the formation of a reddish combination. He considers the sources of error of the colorimetric methods, the faulty specificity, the slight sensitiveness, the uncertainty of the reactions near the limits of the sensitiveness, and points out particularly how difficult it is to use these tests in organic fluids because of the primary lack of clearness of the latter, their variable colors, the weakness of the sensibility of the reactions usually in the presence of organic material, and the impairment of the reaction by a preceding deposit of albumin. He goes into the reaction in the eye of the frog quite extensively and concludes that the great majority of the investigations made in this manner have been performed under unsatisfactory conditions. He speaks further concerning the behavior of different kinds of frogs, the way of measuring the pupil of the enucleated eye, the probable sources of error, which may explain the contradictory results obtained by former writers, and the specificity of the reaction, its weakening and sensibilization by other materials. By the use of the reaction with the precautions he mentions he obtains the following results: A powerful, positive reaction is always to be obtained in the venous blood of the suprarenal capsules, but nowhere else in the body except in these and their accessory organs. The various pathological conditions in which some authors have demonstrated adrenalin by the frog's eye test, always gave negative results. This seems to be proven conclusively by experimental adrenalinæmia, because it is shown that such a large increase of adrenalin is necessary in order to obtain a positive reaction from the entire blood, that the animal is generally severely poisoned.

MAYÖU (439, **Serum and vaccine therapy in connection**

with diseases of the eye) gives a very complete exposition of the history and development of our present knowledge of this method of treatment. His experience has extended over six years. He formerly made use of the opsonic index in grading the dosage, but later found that the eye reactions gave an accurate indication of the dose required. Most of the original investigations have been carried on with tuberculin and staphylococcal injections in the form of vaccines. The ophthalmic diseases treated and his conclusions are as follows: In all cases of stytes the injections, generally of staphylococcic vaccines, were successful, especially when autogenous—that is, recurrences were prevented. In chalazion the method was not so satisfactory. In streptococcal infections the treatment must be instituted early and the polyvalent serum was most useful. From his limited experience with gonococcal serum he concludes that this treatment is not superior to the ordinary nitrate of silver method. The treatment of trachoma by the injection of the sterilized conjunctival discharge was without results. He finds jequiritol of value, especially in recent cases with pannus. He relates four cases of scleritis which were treated satisfactorily with tuberculin. In 30 cases of chronic, non-infected uveitis of endogenous origin he found 15 tuberculous, 10 staphylococcal, and 5 syphilitic. In tuberculosis, when the patient has no extensive lesion elsewhere, he administers at first  $\frac{1}{1000}$  mg of T. R., and increases the dose gradually to  $\frac{1}{250}$  mg. His results were highly satisfactory. The staphylococcic infections were treated by mixed as well as by autogenous vaccines, but the latter were the more efficient.

#### ALLING.

In experiments to determine the practical applicability of the chemotherapeutic action of ethylhydrocuprein upon the pneumococcal infection of the cornea in mice, MORGENROTH and GINSBERG (440, **The action of the cinchona alkaloid upon the cornea**) discovered that a total anæsthesia of the cornea was produced by the conjunctival instillation of aqueous solutions of the hydrochlorates of ethylhydrocuprein, hydroquinine, and quinine. They tested this anæsthetic effect carefully by touching the cornea of the spontaneously opened eye of a rabbit with a probe and observing the lid reflex, and found the anæsthesia to be complete in from one to two

minutes after the instillation of a 20 or 10% solution of either of the two former. The anæsthesia produced by a 20% of ethylhydrocuprein was still complete at the end of ten days, and passed off at the end of sixteen days; a solution of hydroquinine of the same strength produced a total anæsthesia that lasted fifteen days. A 1.25% solution of ethylhydrocuprein produced total insensitiveness of the cornea, which lasted from  $\frac{1}{2}$  to 1 hour. Solutions of from 0.5 to 0.63% did not always produce total anæsthesia. With 3% solutions of quinine hydrochlorate a total anæsthesia was produced in a minute and a half which lasted an hour; with weaker solutions the effect was less marked. Concerning the after-effects the following may be noted: solutions of the strength of 10 to 20% cannot be used practically, because they almost invariably cause great opacity of the cornea with more or less chemosis. Five per cent. solutions commonly produce at the end of a minute a slight, transient mucous secretion. No after-effects were observed in the rabbit's eye from the use of solutions of 2.5% and upwards. One observation of the authors which is striking is that when they used a 10% oily solution of ethylhydrocuprein they obtained an imperfect anæsthesia and less marked after-effects than when they used watery solutions of the same strength.

SIMON (441, *After-effects of neosalvarsan*) calls attention to the contradictory views concerning whether neosalvarsan is in fact less poisonous than salvarsan. He maintains that those who believe it not to be less poisonous give it in much larger doses, so that no direct comparison can be drawn. In general he thinks that all of the after-effects of neosalvarsan that have been observed were mild and lasted only a few hours, with the exception of two. In one of the latter the clinical picture was identical with the so-called "angioneurotic syndrome," which has been observed repeatedly after salvarsan; in the other the case was one of "acute swelling of the brain" and "medicinal exanthem."

IV.—METHODS OF RESEARCH, REMEDIES, INSTRUMENTS,  
AND GENERAL OPERATIVE TECHNIQUE. Reviewed  
by LOEHLEIN.

442. DESCHWEINITZ, G. E. Treatment of various forms of ocular syphilis with salvarsan. *Therapeutic Gazette*, May 15, 1912.

443. HOROVITZ. The influence of cocaine and homatropine upon the accommodation and the size of the pupil. *Zeitschr. f. Augenheilkunde*, Dec., 1912, p. 530.

444. PECHIN. Paraplegia following an injection of salvarsan in a patient with hereditary syphilis and interstitial keratitis. *La clinique ophtalm.*, iv., p. 257.

445. SANTOS-FERNANDEZ. Mydriasis due to adrenalin. *Revue générale d'ophtalmologie*, xxxi., p. 433.

446. SANTOS-FERNANDEZ. Duboisine preferable to atropine in the treatment of diseases of the eye, especially in children. *Ibid.*, p. 532.

447. SUKER, G. F. Use of conjunctival flap in perforating wounds of the eyeball. *Illinois Med. Journal*, Nov., 1912.

DESCHWEINITZ (442, **Treatment of various forms of ocular syphilis with salvarsan**) regards non-inflammatory optic atrophy as a contra-indication, but thinks that the treatment is indicated in specific optic neuritis. His experience has been contrary to that of some who do not believe it to be beneficial in syphilitic interstitial keratitis. The use of salvarsan he has found disappointing in palsies of the ocular muscles.

ALLING.

PECHIN (444, **Paraplegia following salvarsan**) reports a case of this nature met with in a 15-year-old girl suffering from interstitial keratitis due to hereditary syphilis. Intramuscular injections of mercury were first given, and then 20cgm of neosalvarsan were injected intravenously. No ill effects were noticed at first, but on the sixth day paraplegia appeared with a slight fever, but no premonitory symptoms, as is almost always the case in syphilitic paraplegias. As no other signs of arsenical poisoning were present this would seem to be a neurotropic effect of the drug, which may in time be avoided.

CAUSÉ.

SANTOS-FERNANDEZ (445, **Mydriasis due to adrenalin**) says that the mydriatic effect of adrenalin, which is not seen very often, appears best in eyes that are physiologically normal and not the seat of any kind of inflammatory changes. The mydriasis may be prevented by the simultaneous administration of alypin, and increased by combination with cocaine. The intravenous use of adrenalin is to be avoided, because it is apt to cause atheromatous changes. The application of adrenalin is limited principally to its use in operations. The



mydriasis is probably to be ascribed mainly to the expulsion of the blood from the vascular network of the iris.

CAUSÉ.

SANTOS-FERNANDEZ (446, **Duboisine preferable to atropine**) maintains that the use of atropine should be confined to selected cases, and that duboisine should be employed by preference, especially in children. Atropine has often been observed to have an exciting effect, while that of duboisine is quieting, and it is at the same time less toxic.

CAUSÉ.

In order to clear up the contradictory statements concerning the cycloplegic and mydriatic effect of cocaine and homatropine, HOROVITZ (443, **Influence of cocaine and homatropine upon the accommodation and the size of the pupil**) instituted a series of experiments on students with perfect vision and determined, by the aid of Adam's accommodometer, that cocaine produces a cycloplegia which begins in 5 to 10 minutes, increases rapidly, attains its acme—total paresis—with large doses, in about half an hour, and passes off, as a rule, in two hours. The mydriatic effect reaches its acme a little later, in about  $\frac{3}{4}$  of an hour, and lasts 4 or 5 hours. With homatropine, cycloplegia is noticeable after 10 or 15 minutes, reaches its acme, perhaps total paresis, after about  $1\frac{1}{2}$  hours, and ends in about 25 hours; the course of the mydriasis is fairly evenly parallel with that of the cycloplegia. Experiments on persons of different ages confirm the statements of Hess and Treutler that the cycloplegic effect of these drugs is more marked in young than in old people, as in the former the manifest range of accommodation suffers very quickly, while in old persons the latent range of accommodation is first affected and then the still remaining trace of the manifest suffers in sympathy. In the comparative measurements of eyes of different refractions it is striking that a greater range of accommodation is present in myopic eyes than in emmetropes of the same age, an observation that is not in harmony with the greater development of the ciliary muscle in the hypermetropic eye and its constant exercise in accommodation.

SUKER (447, **Conjunctival flap in perforating wounds**) thinks that the Kuhnt flap is useful in corneal fistulæ, corneal

ulcers, corneal and scleral staphylomata, prolapse of the contents of the eye, hernia of the iris, extensive conical cornea, wounds, and as a protection to the cornea in conditions similar to gonorrheal ophthalmia in which perforation is liable to happen.

ALLING.

V.—ANATOMY, EMBRYOLOGY, MALFORMATIONS. Reviewed by PAGENSTECHER.

448. COSMETTATOS. Congenital remains of the anterior segment of the vascular tunic of the crystalline lens. *Annales d'oculistique*, cxlviii., p. 241.

449. PETERS. Congenital staphyloma of the cornea and other malformations of the eye. *Zeitschrift f. Augenheilkunde*, 1912, p. 604.

450. PLANGE, H. O. Congenital anomalies of the iris. *Ibid.*, p. 492.

451. WHITNALL, S. E; the naso-lachrymal canal; the extent to which it is formed by the maxilla; the influence of this upon its caliber. *Ophthalmoscope*, October, 1912.

COSMETTATOS (448, Congenital remains of the anterior segment of the vascular tunic of the crystalline lens) describes particularly the remains of the membrana capsulo-pupillaris and the membrana pupillaris. Both of these membranes exist during the greater part of intra-uterine life; the former is absorbed during the seventh month, the latter during the eighth. The incomplete absorption of these membranes may cause a great deal of visual disturbance. The membrana capsulo-pupillaris is situated during intra-uterine life between the equator of the lens and the anterior margin of the secondary optic vesicle; remains of it are therefore visible only when the pupil is dilated, and are almost always punctate, white, brown, or light. Pure cases of this kind have been observed only eight times, but the mixed form of membrana capsulo-pupillaris + pupillaris is common. The remains of the pupillary membrane are membranous, filamentous, or punctate. The first two varieties originate from the anterior surface of the iris, either its periphery, minor circle, or free margin, and are inserted into the anterior capsule of the lens. Membranous remains of the pupillary membrane coming from the margin of the pupil are very rare. Punctate remains are to be found on the anterior surface of the lens, more rarely on the anterior

surface of the iris, or floating in the anterior chamber. Only a few cases have been seen in which remains of the pupillary membrane were adherent to the posterior surface of the cornea; Cosmettatos contributes one of these, in which there existed congenitally a filamentous connection between the iris and the cornea, probably due to an incomplete separation of the pupillary membrane from the tissue of the cornea in the third month. In many cases the failure of the pupillary membrane to become absorbed, or to become absorbed completely, is due to an intra-uterine inflammation, in others to a defect of absorption. The variations in the insertion of the pupillary membrane into the anterior surface of the iris depends according to Cosmettatos, upon the size of the cleft which forms in the seventh month between the mesenchym of the iris and the pupillary membrane near the pupil and finally separates them from each other; any disturbance of this development at any place on the margin of the pupil or on the anterior surface of the iris may result in the location of the insertion. Punctate remains on the anterior capsule of the lens are cellular residuæ, while the stellate are probably caused by the insertions of vessels. In both it is supposed that a filamentous connection existed between the pupillary membrane and the anterior surface of the lens which became broken. For the rest there is as yet no satisfactory theory for the genesis of anomalies of the tunica vasculosa lenticis, except in those cases that are complicated with other malformations, in which a common cause may be assigned to all of the pathological symptoms.

CAUSÉ.

PETERS (449, **Congenital staphyloma of the cornea and other malformations of the eye**) shows that a defective formation of Descemet's membrane and anterior synechiæ are features that are common to congenital opacities of the cornea and to congenital staphylomata.

PLANGE (450, **Congenital anomalies of the iris**) describes a rare malformation of the anterior mesodermal layer of the iris. It consisted of absence of the pupillary portion of the anterior layer of the iris with a rudimentary development of its ciliary portion, multiple cleavages of the ciliary portion from the retinal under layer, and adhesion to the posterior surface of the cornea in both eyes. The patient suffered also from

cataract and corneal opacity. Her father had a similar malformation.

WHITNALL (451, **The naso-lachrymal canal**) presents a short article based on the study of 50 European skulls. Figs. 1, 3, and 4 illustrate different degrees of formation of the medial wall of the canal by the approximation of the lips of the sulcus lacrimalis of the maxilla. In 7 bones he found a union of these lips which produced a narrowing of the canal. In these cases it is obvious that a slight cause might lead to occlusion of the naso-lachrymal duct.

GROUT.

VI.—NUTRITION AND INTRAOCULAR TENSION. Reviewed by  
WESSELY.

452. BEHR. Is there an outflow from the vitreous into the optic nerve in man? *Arch. f. Ophthalmologie*, lxxxiii., 3.

453. HAMBURGER. The intraocular flow of fluid. *Meeting of the Berlin Ophthalmological Society*, November, 1912.

BEHR (452, **Outflow from the vitreous into the optic nerve**) injected five eyes before enucleation with methylene blue, and one with india ink, and enucleated them from ten minutes to an hour later. Unfortunately nothing is said about the pathological changes that rendered enucleation necessary. No trace of the coloring matter was found in the optic nerves, although the vitreous seemed to be stained uniformly. This result leads him to believe that there is in man no outflow from the eye through the optic nerve.

HAMBURGER (453, **The intraocular flow of fluid**) instituted experiments to determine the outflow from the eye under increased pressure, and particularly to learn whether the cicatrix resulting from an iridectomy was specially permeable for fluid. A 2% solution of indigotin-sulphonate of sodium was injected into the anterior chamber and the pressure determined by means of a manometer. The results he obtained showed that normally absorption through the vessels of the iris far surpasses that by way of Schlemm's canal. When the pressure is increased the iris becomes full like a sponge and is then no longer in condition to absorb. Absorption takes place also through the cornea. When an iridectomy had been performed on an eye, the scar left proved to be the palest



portion of the entire circumference of the cornea, the portion that was colored least, showing that the cicatrix, so far from being the most permeable, was the least so for fluid. The difference between the scar and its surroundings was so marked that the coloring matter stopped exactly at its edge. Hamburger concludes that the outflow from the eye is in no way a process of filtration of mathematical constancy in a unit of time, but is a slow absorption, analogous to the outflow from other cavities in the body.

KOELLNER.

VII.—THE SENSE OF SIGHT. Reviewed by KOELLNER.

454. BETTREMIEUX. **Does a hystero-traumatic binocular diplopia exist?** *Société belge ophtalm.*, November.

455. ZEEMANN. **The vision of the one-eyed.** *Klin. Monatsblaetter f. Augenheilkunde*, December, p. 657.

BETTREMIEUX (454, **Does a hystero-traumatic binocular diplopia exist?**) does not try to answer this question with certainty, but reports one case of his own, and refers to several similar ones in literature, in which a binocular diplopia persisted as the only symptom after an accident. His patient received a severe contusion of the left orbit, followed by œdema and ecchymosis of the lids and by paradoxical double images which could not be ascribed to a lesion of any certain muscle. Bettremieux is of the opinion that the diagnosis of a hystero-traumatic diplopia, which is naturally closely related to traumatic neurosis, is justifiable only after all other possibilities have been excluded.

CAUSÉ.

According to ZEEMANN (455, **Vision of the one-eyed**) the vision of the one-eyed differs from the vision of those with two eyes in the following manner: The brightness of objects must be a little less to the one-eyed, though this factor is of no practical moment. In how far the acuteness of vision is reduced, he does not venture to determine. He thinks it possible that the accuracy of fixation and of focussing may be greater with the two eyes, so that the vision is only apparently improved. There seems to be no noteworthy difference between the working power of the one-eyed and the two-eyed. The perception of depth of the one-eyed cannot, he thinks, be

ascribed to the feeling produced by accommodation and convergence, for, according to the researches of Hildebrand and Bourdon, the former has no influence on the vision of depth, and the latter occurs only in the two-eyed. The one-eyed can perceive only the direction of an object, not its distance; this he determines from the changes produced by movements of the head (monocular parallax), and by such secondary aids as shadows, and a knowledge of the size of the object; consequently a certain period of observation is necessary for perception of depth. Experiments show that in a 3 rod test, in which the normal person requires but  $\frac{1}{200}$  of a second for positive vision of depth, the one-eyed needs at least  $\frac{1}{2}$  a second in which to form a judgment. Hence he concludes that the intellect plays a great part in the adaptation of such men to their callings, and that this must be taken primarily into account in investigations concerning the perception of depth of the one-eyed. Uniformity of the work greatly favors adaptation, so a change of occupation is to be deprecated. No method of measuring the perception of depth of the one-eyed can give information concerning their ability to work.

VIII.—ACCOMMODATION AND REFRACTION. Reviewed by KOELLNER.

456. DUANE. A. Normal values of the accommodation at all ages. *Jour. Amer. Med Assoc.*, Sept. 21, 1912.

457. V. ROHR and STOCK. A method of testing subjectively the effects of glasses. *Arch. f. Ophthalm.*, lxxxiii., page 189.

458. ROTHMANN. Treatment of high myopia. *Inaug. Dissert.*, Strassburg.

DUANE (456, Normal values of the accommodation at all ages) has continued his studies of the normal accommodation and now presents the results of the examination of 1500 cases. The mean values of accommodation at different ages are as follows:

Age	8	13.8
"	12	13.1
"	16	12.4
"	20	11.5
"	24	10.4
"	28	9.4

Age	32	8.3
"	36	7.1
"	40	5.9
"	44	4.2
"	48	2.5
"	52	1.6
"	56	1.2
"	60	1.1

ALLING.

STOCK and v. ROHR (457, **Subjective testing of the effects of glasses**) render one eye ametropic, for example artificially aphakic, by means of Fick's contact glass, and were then able to judge the effects produced by the modern correcting glasses for monolateral aphakia. The results were not unfavorable so far as the correcting glasses themselves are concerned, but the writers emphasize the point that most patients with monolateral aphakia refuse to wear the glass for cosmetic reasons, as the distance between the lenses gives it quite a striking appearance.

ROTHEMANN (458, **Treatment of high myopia**) gives the statistics of Fukala's operation during the past eleven years at the Strassburg eye clinic. Detachment of the retina took place in 3 cases, 9.7%, about the same percentage as that elsewhere obtained. In one case six years elapsed before the beginning of the detachment. In two other cases retinal hemorrhages appeared. He later advises against the operation because it is possible to improve the vision with the telescope lens, with which the results obtained are very satisfactory.

IX.—THE MOTOR APPARATUS OF THE EYES. Reviewed by  
KOELLNER.

- 459. BECK. **Nystagmus in fever.** *Wiener klin. Wochenschr.*, 46, p. 1831.
- 460. BROWNE, F. J. and MACKENZIE, J. ROSS. **The etiology and treatment of miners' nystagmus.** *Brit. Med. Jour.*, Oct. 5, 1912.
- 461. BUTLER, T. HARRISON. **Miners' nystagmus.** *Ophthalmoscope*, Dec.
- 462. CAESAR. **The judging of concomitant strabismus.** *Vossius' Samml. zwanglos.*, Abhandl. viii., No. 8.
- 463. CASSIMATIS. **A case of primary divergent strabismus with hypermetropia; some general notes concerning concomitant strabismus in Egypt.** *La clinique ophtalmologique*, iv., p. 517.
- 464. COURT, JOSIAH. **Miners' nystagmus: a retrospect.** *Ophthalmoscope*, Dec., 1912.
- 465. CRIDLAND, BERNARD. **Miners' nystagmus.** *Ibid.*, Dec., 1912.

466. DRANSART. **Miners' nystagmus.** *Soc. belge d'ophthalm.* Nov., 1912.
467. ELWORTHY, H. S. Color and light in relation to miners' nystagmus. *Ophthalmoscope*, Dec., 1912.
468. HOWE, L. Measurement of fatigue of the ocular muscles. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.
469. LANDOLT, E. Operations on the vertical muscles of the eyes. *Arch. d'ophthalmologie*, xxxii., p. 593.
470. LLEWELLYN, THOMAS L. On miners' nystagmus (neurosis). *Ophthalmoscope*, Dec., 1912.
471. MANN. Galvanic vestibular reaction. *Neurolog. Zentralbl.*, p. 1356.
472. MARINO. The theories concerning the mechanism of the associated lateral and convergence movements, studied from the results of experimental investigation by means of transplantation of ocular muscles in monkeys. *Dtsche. Zeitschr. f. Nervenheilk.*, xlv., p. 138.
473. RUSCHKOWSKY. Wicherkiewicz' operation of tenotomy of the four recti for sympathetic ophthalmia. *West. Ophthalm.*, Nov., 1912.
474. USHER. Case of congenital nystagmus with microscopical examination of eyeballs. *The Royal London Ophthalmic Hospital Reports*, p. 440.

MARINO (472, **Associated lateral and convergence movements**) instituted experimental researches concerning the centers of the associated movements of the eyes by transplanting the muscles of monkeys so that one muscle took the place of another. He found that convergence took place shortly after a muscle not supplied by the oculomotor nerve, either the superior oblique or the external rectus, had been substituted. This proves that monkeys have neither a supranuclear nor a nuclear center for convergence. In the same way he found that lateral movements took place whether with two interni, with one externus and one superior oblique, with one internus and one superior rectus, or with two externi transplanted. Hence there can be no supranuclear or nuclear center for the lateral movements of the globe in monkeys. His observations covered both the voluntary movements of the eyes, rotation, faradic, and caloric nystagmus, and the effect of experimental faradic stimulation of circumscribed zones of the cortex.

According to MANN (471, **Galvanic vestibular reaction**) the galvanic nystagmus is excited by a current of from 4 to 8 milliamperes. He uses circular electrodes, 4cm in diameter, pressed upon the tragus or mastoid. The nystagmus is



usually a mixed horizontal and rotatory, with the rapid component toward the side of the cathode. Ordinarily it is less marked than the caloric nystagmus and appears only when the patients look in the direction of the cathode, while the caloric nystagmus can be seen in whatever way the patient looks. The caloric test is diagnostically the more useful.

In a case of congenital nystagmus USHER (474, **Congenital nystagmus**) examined both eyes microscopically in series of sections. The child was 2 years old, the oscillations were 120 per minute, the condition of the eyes otherwise normal. The eyes were placed in formalin  $5\frac{1}{2}$  hours after death. The examination revealed an abnormal formation of the macula lutea, in that several layers of well-formed ganglion cells were present everywhere, so that a true fovea was wanting. Apparently an inhibition had taken the place of the normal involution of the retinal layers in question.

It has been observed several times that nystagmus not of otogenous origin may appear in febrile diseases. BECK (459, **Nystagmus in fever**) has collated 56 cases of pneumonia, acute articular rheumatism, etc., in which this has occurred, and finds that there are three types of febrile nystagmus. (1) Most frequently there is a rotatory-horizontal nystagmus when the eyes are turned to the right or left, while the vestibular reaction is normal. (2) Horizontal nystagmus on looking to one side with hyperexcitability to caloric irrigation. (3) In three cases he noticed in caloric irrigation that the rapid component of the nystagmus was absent and there was simply a deviation of the eyeball in the direction of the slow component. The nystagmus was always temporary, *i.e.*, it disappeared as the fever passed away. Concerning the manner in which this symptom is brought about, hyperæmic oedematous conditions are suggested as analogous to the conditions in diseases in the posterior fossa of the skull and to the febrile nystagmus present when there are changes in that region.

The following is an abstract of the papers by BUTLER, COURT, CRIDLAND, ELWORTHY, and LLEWELLYN (461, 464, 465, 467, 470, **Miners' nystagmus**) which formed part of the discussion in miners' nystagmus at the Ophthalmological Congress, Oxford, 1912. Miners' nystagmus is a disease that is peculiar to the coal miner. It usually comes on after several

years' work in the mine, or it may be delayed for 20 to 30 years. The number of miners affected varied with different mines. The cause of this condition is a combination of causes, the most important of which is poor illumination. With a reduced amount of light the fovea is insufficiently stimulated and the eye seeks to place the image on a more sensitive point in the retina. Some of the other causes that have been mentioned are the position of the miner, refractive errors, and inhalation of coal gas. As to treatment, change of occupation will improve the condition, but when the patient returns to the mine the nystagmus increases.

GROUT.

DRANSART (466, **Miners' nystagmus**) considers paresis of the internal recti to be the predisposing factor in the cause of this trouble, for it is demonstrable in 97% of the cases. The wearing of prismatic glasses with their bases in appears to have an influence upon it. In very bad cases advancement may be indicated.

DANIS.

BROWNE and MACKENZIE (460, **Miners' nystagmus**), from the examination of 100 cases, find the following factors to contribute to the production of this condition: (1) Inadequate light; (2) errors of refraction; (3) straining of the extrinsic muscles of the eyeball; (4) neurotic temperament. Treatment consists in having better illumination, correcting refractive errors, rest, and strychnine.

GROUT.

CASSIMATIS (463, **Divergent strabismus with hypermetropia**) observed a primary divergent strabismus in a 17 year-old-girl with hypermetropia of both eyes. The squint appeared when she was 11 years old and, at the time of the examination, caused asthenopic troubles. The hypermetropia of the fixing eye was 1.75 D., that of the squinting eye 2.5 D. Abduction was increased, while adduction was very weak; this Cassimatis considers the principal cause of the strabismus. After wearing the proper correction for a month an advancement with tenotomy was performed on both eyes, which succeeded in giving them a faultless position with stereoscopic vision. At the operation, the tendon of the internus of the squinting eye was found to be much weaker than the other ocular muscles.

CAUSÉ.

CAESAR (462, **The judging of concomitant strabismus**) says that strabismus is to be ascribed to a faulty power of fusion, which is either congenital, inhibited during development by an infectious disease, or impaired by the loss of vision of one eye. Treatment consists of (1) correction of the error of refraction, which cannot be done too early; (2) exercise of the amblyopic eye, if one be present; the results of this were negative in 34%, and are the more likely to be negative the older the children; (3) exercise of the power of fusion. The most suitable age for this is between 5 and 10 years. Of the successful cases, fusion was maintained after the lapse of a year or two in 70%. When all conservative measures fail an operation is necessary, but this is not advisable before the twelfth year.

HOWE (468, **Fatigue of ocular muscles**) uses a pair of revolving Crété prisms by means of which any prism strength may be obtained by pushing up a pointer on the handle of the instrument. The elevation of the pointer is recorded on a revolving drum. The subject is requested to state when the images appear double and then the pointer is immediately dropped to zero. He thus produces tracings showing endurance of muscle convergence and divergence and the development of fatigue. He calls the instrument an ophthalmic ergograph, and thinks it will open a new field in ophthalmology.

ALLING.

LANDOLT (469, **Operations on the vertical muscles of the eye**) says that operative interventions on the vertical muscles have less effect than on the lateral, so over-corrections are particularly necessary. In one of the cases he reports, one of resection and advancement of the right superior rectus, a primary over-correction of 4° passed off within a month, leaving binocular fusion; in another, a resection and advancement of the right inferior rectus because of paresis of the superior oblique, an over-effect of 7° had almost completely disappeared at the end of six weeks. In a third case, in which a bilateral paresis of the interni had been obviated by advancement 13 years before, an over-correction of 16° disappeared within a few weeks after resection and advancement of a paretic inferior rectus. Landolt declares that the mathematical regulation of an operation for strabismus is a chimera. He employs advancement exclusively and considers tenotomy to be justi-

fied only on the superior rectus, because this muscle functionates in a field that is used very little, and a defect in excursion here can be easily compensated for by elevation of the head.

CAUSÉ.

Five years ago Prof. B. Wicherkiewicz suggested the operation of tenotomy of all four of the recti muscles for cosmetic purposes and to prevent sympathetic inflammation, taking the ground that the pressure of the muscles upon the injured eyeball must produce a nervous irritation which, under certain circumstances, may be reflected to the other eye and set up a sympathetic inflammation. RUSCHKOWSKY (473, **Tenotomy of the four recti for sympathetic ophthalmia**) describes three cases in which he has performed this operation, and comes to the following conclusions: After tenotomy of the four recti the symptoms of traumatic irido-cyclitis pass away, the eye becomes quiet and painless, the symptoms of sympathetic irritation disappear from the other eye, and sympathetic inflammation yields more readily to therapeutic treatment. The good influence upon the eye sympathetically inflamed confirms the ciliary vascular theory of Schmidt-Rimpler. This operation can take the place of enucleation in many cases, excluding of course those in which a neoplasm, a foreign body, or a parasite is present.

V. POPPEN.

#### X.—LIDS. Reviewed by KRAUSS.

475. BRUNETIÈRE. Contribution to the etiology of acute recurrent oedema of the lids. *La clinique ophtalm.*, iv., p. 506.

476. TERRIEN and HILLION. Congenital spasmodic retraction of the upper lid. *Arch. d'ophtalm.*, xxxii., p. 768.

477. WERNKE. Anomaly of the upper lid. *Meeting of the Ophthalmic Society in Odessa*, Oct. 20th.

WERNKE (477, **Anomaly of the upper lid**) found in the outer third of the left upper lid, 3 or 4mm above its margin, a funnel-like depression, 3 or 4mm in diameter, out of which eyelashes grew. From this place to the upper margin of the orbit extended a bridge, which was very much in the way when an attempt was made to evert the lid. No changes were present in the margins of the lids. The writer is of the opinion that this condition was congenital and of the nature of a coloboma, although the characteristic cleft was wanting. It may be that



the latter had cicatrized and had formed the depression in doing so.

V. POPPEN.

TERRIEN and HILLION (476, **Congenital spasmodic retraction of the upper lid**) describe a case of this nature met with in a boy 9 years old, whose eyes were otherwise normal. The cause of the condition was probably a tonic spasm of the levator palpebræ. The palpebral fissure was lengthened horizontally 2mm, and widened vertically so that about 2mm of the sclera was uncovered. Graefe's sign was well marked. The upper lid was raised still higher after the instillation of cocaine; the action of pilocarpine was more marked on the affected side, from which it was concluded that the spastic retraction was not caused by irritation of the sympathetic.

CAUSÉ.

BRUNETIÈRE (475, **Etiology of acute recurrent œdema of the lids**) divides this condition into 3 classes: the arthritic, the neuropathic, and the toxic œdema. The first two varieties are well known, while the toxic form has been least observed, although it is the most common. Among the exogenous intoxications, the medicamental (iodide of potash, antipyrin, serum, etc.) and the alimentary are the principal ones. Endogenous intoxications originate chiefly from the gastrointestinal tract. In this respect recurrent œdema greatly resembles urticaria.

CAUSÉ.

#### XI.—LACHRYMAL ORGANS. Reviewed by KRAUSS.

478. FRENKEL. **Mikulicz's syndrome in a physiological condition.** *Arch. d'ophtalm.*, xxxii., p. 721.

479. TOOKE F. **Polypoidal formation in the lachrymal sac.** *Trans. Amer. Ophth. Soc.*, 1912.

FRENKEL (478, **Mikulicz's syndrome**) shows that Mikulicz's syndrome, swelling of the salivary and lachrymal glands, is not necessarily a pathological symptom, as at least a moderate swelling of one or all of these glands is frequently to be observed under perfectly physiological conditions in the region about Toulouse. He is particularly opposed to the idea that tuberculosis is the cause of Mikulicz's disease.

CAUSÉ.

TOOKE (479, **Polypoidal formation in the lachrymal sac**) in a series of fifty cases of extirpation of the lachrymal sac

found two with definite polypoid formation. In neither case had there been purulent discharge, nor had the canaliculi been slit or probed. The polypi were pedunculated and situated in the neighborhood of the nasal duct.

ALLING.

XII.—ORBITS, INCLUDING EXOPHTHALMOS, ACCESSORY SINUSES. Reviewed by KRAUSS.

480. FEJER. A case of contralateral atrophy of the optic nerve caused by retrobulbar sarcoma. *Zentralbl. f. pract. Augenh.*, Nov., p. 490.

481. GINSBURG. Treatment of pulsating exophthalmos. *Klin. Monatsbl. f. Augenheilkunde*, Dec., p. 698.

482. GRUENING, E. Idiopathic hæmatoma of the orbit. *Trans. Amer. Ophth. Soc.*, 1912.

483. HANDMANN. Temporary myopia with orbital neoplasms. *Zeitschr. f. Augenheilkunde*, Dec., p. 542.

484. KNAPP, A. The Kroenlein operation as an exploratory procedure in affections of the orbit. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

485. POSEY, W. C. Small round-celled myosarcoma of orbit with extension into the eyeball. *Penn. Med. Jour.*, April, 1912.

486. POSEY, W. C. Orbital cellulitis from disease of the superior maxilla in children. *Jour. Amer. Med. Assoc.*, Sept., 21, 1912.

487. WEEKS, J. E. Some cases illustrating ocular disturbances due to disease of the nose and accessory sinuses. *N. Y. State Jour. of Medicine*, Oct., 1912.

488. WEEKS, J. E. A case of endothelial sarcoma of the orbit. *Trans. Amer. Ophth. Soc.*, 1912.

489. ZENTMAYER, W. A case of plexiform neurofibroma involving the orbit. *Ibid.*, 1912.

GRUENING (482, Idiopathic hæmatoma of the orbit) saw a girl of 17 with exophthalmos of the right eye amounting to 15mm. The history was that it appeared after an attack of severe pain in the eye accompanied by vomiting. The conjunctiva below the cornea was enormously swollen so that it overlapped the lower lid. Examination with the ophthalmoscope revealed a choked disk. The Kroenlein operation disclosed a sac filled with fluid blood, which was evacuated. The exophthalmos and optic neuritis disappeared.

ALLING.

KNAPP (484, The Kroenlein operation as an exploratory procedure) calls attention to the advantages of this operation in diagnosis in morbid conditions of the orbit. The cutaneous incision should be slightly to the outer edge of the periosteal

and bony wound. The periosteum is then carefully raised with a sharp flat elevator and the bony wedge elevated without sacrifice of the orbital margin, so that it may be firmly wedged later to keep it well in place. It is advisable to suture the eyelids as chemosis is likely to follow the operation. Two cases are recorded. The operation in a patient who gave the history of an orbital tumor of one year's duration disclosed a diffuse growth on the outer side and below the eyeball, extending to the apex of the orbit. Being too extensive to eradicate by this method all the contents of the orbit were removed later. The tumor consisted of fibrous tissue with hypertrophy of epithelium-like cells. The other case was one in which a plexiform neuroma of the eyelid had been removed seven years before. An oval tumor was discovered at the apex of the orbit and enucleated entire. It was a fibro-neuroma.

ALLING.

ZENTMAYER (489, **Plexiform neurofibroma involving the orbit**) found a hemispherical mass in the left temporal region with an extension to the orbit above the eyeball and along the roof of the orbit to the apex. It was composed of medullated and non-medullated nerve fibers in a mass of fat and connective tissue.

ALLING.

WEEKS (488, **Endothelial sarcoma of the orbit**) discovered by means of the Kroenlein operation a small tumor 10mm by 12mm in the apex of the orbit. The considerable amount of exophthalmos present was explained as being due to obstructed circulation. The tumor had developed during eight years, the first symptom being blurring of the vision following a severe blow.

ALLING.

FEJER (480, **Contralateral atrophy of the optic nerve caused by retrobulbar sarcoma**) describes a case of this nature. After removal of the eyeball and exenteration of the orbit the vision of the other eye improved to  $\frac{5}{80}$ , though the projection remained faulty. The visual field became larger, but remained considerably contracted, especially in its outer portion. The pupillary reaction returned and the decoloration of the papilla became less. Examination of the contents of the orbit showed that a sarcoma of the chorioid had broken through the coats of the eyeball and filled the retrobulbar space. The affection of the left eye was doubtless connected with the spread of the

tumor in the right orbit; probably the latter caused a collateral œdema which compressed the left optic nerve and led to a partial degeneration. In what way the œdema extended could not be told, but it is suggested as likely that it was through the accessory sinuses.

POSEY (485, **Small round-celled myosarcoma of orbit**) found a tumor mass in the orbit by means of the Kroenlein operation. Thinking that it was malignant the eye was removed and a dense mass of non-pigmented spindle cells was found involving an area of the chorioid and following the course of the vortex veins through the eyeball. The tumor apparently originated as an endothelial sarcoma of the orbit and slowly followed the blood-vessels. It did not seem reasonable that the interior of the eye should have remained so free from involvement if the point of origin had been there.

ALLING.

GINSBURG (481, **Pulsating exophthalmos**) has tabulated the results of treatment of 100 cases of pulsating exophthalmos. Ligation of the carotid gave either a cure or improvement in 63.7% of the cases. Bilateral ligation of the carotid is attended by a high mortality. Ligation of the superior ophthalmic vein is rarely performed alone, but usually in combination with ligation of the carotid on the same side, and this is the procedure that has given the best results.

HANDMANN (483, **Temporary myopia with orbital neoplasms**) describes three cases of orbital affections in which pressure was made upon the globe in such a manner as to cause myopia. In the first case, a girl 12 years old, a myopia of 2 D. changed to emmetropia after the evacuation of an abscess in the inner portion of the upper lid which pressed upon the eyeball. The abscess probably came from the ethmoid. The second case was one of crushing of the roof of the orbit in a boy 14 years old, with the subsequent formation of a soft callus. This tumor pressed the eyeball downward about  $\frac{1}{2}$  cm and produced a myopia of 0.5 D. which changed to emmetropia after the tumor had changed into a hard mass, probably because it became a little smaller, although the dislocation of the eyeball was not lessened. In the third case a child 3 years old received a slight blow from a stone on the outer margin of the left orbit. An abscess formed which displaced the eyeball



far to the nasal side. Myopia was distinctly present in this eye, estimated at between 1 and 2 D., but after the evacuation of the abscess and the subsequent healing the skiascope showed the refraction to be emmetropic. In all three cases the other eye was emmetropic or hypermetropic. Handmann thinks that these tumors pressed in such a way upon the walls of the eyeballs as to diminish their equatorial and increase their sagittal diameters.

POSEY (486, **Orbital cellulitis from disease of the superior maxilla in children**) relates two cases showing abscess formation in the lids and cheeks of children 1 and 2 years of age. Both cases proved to be osteomyelitis of the superior maxilla. In neither case was there a history of traumatism, nor any evidence of sinus or nasal trouble. A previous general infection had taken place to which the condition was considered secondary. He points out that in infancy the cancellous structure of the bone largely predominates, rendering it especially liable to inflammatory processes.

ALLING.

Some of WEEKS's (487, **Ocular disturbances due to disease of the nose and accessory sinuses**) cases are as follows: Case of reflex neurosis affecting upper branch of the fifth and branches of the third supplying the sphincter of the iris and the ciliary muscle, from a furuncle on the inner aspect of the ala of the nose. Neurosis with ciliary spasm and cephalalgia induced by pressure of hypertrophied turbinate. Œdema of the orbit and interference with motility as the result of disease of the orbital ethmoid cells. Monocular exudative neuro-retinitis from non-suppurative but septic process in the posterior ethmoid and sphenoid cells with deviation of the septum.

ALLING.

### XIII.—CONJUNCTIVA. Reviewed by WOLFRUM.

490. ADAMS, P. H. **A case of Parinaud's conjunctivitis due to animal infection.** *Ophthalmoscope*, Dec., 1912.

491. BRUNS, H. D. **Phlyctenular ophthalmia and its etiology.** *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

492. GOURFEIN. **Pseudomembranous conjunctivitis of tuberculous origin.** *Arch. d'ophtalm.*, xxxii., p. 693.

493. ISHIHARA. **Relations between perlèche and blepharo-conjunctivitis, both reduced by diplobacilli.** *Klin. Monatsbl. f. Augenh.*, Oct., p. 418.

494. STEPHENSON, SYDNEY. On the duty of the practitioner in cases of **ophthalmia neonatorum**. *Lancet*, Nov. 16, 1912.

495. STERN. Weakened tuberculosis of the conjunctiva (Parinaud's conjunctivitis). *Zentralbl. f. prakt. Augenheilkunde*, Nov., p. 321.

496. TSCHIRKOWSKY. Clinical observations concerning vaccine and serum therapy of diplobacillary conjunctivitis. *Klin. Monatsbl. f. Augenheilkunde*, Nov., p. 614.

497. WEIDLER, W. B. Pemphigus of the conjunctiva. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

BRUNS (491, **Phlyctenular ophthalmia**) states that this affection is very common among the negro race and may appear later in life than in the white race. He does not regard the disease as tuberculous or eczematous, but rather as a neuropathic manifestation brought about by auto-intoxication caused by derangement in gastro-intestinal functions. A scrofulous diathesis, as well as poor nutrition, are the predisposing causes.

ALLING.

A boy of 7 applied in November to ADAMS (490, **Parinaud's conjunctivitis due to animal infection**) for treatment, with the history that his eye had been swollen for the past week. Examination showed a marked enlargement of the follicles of the conjunctiva with bulbar chemosis. The preauricular gland was large and tender. The bacteriological examination showed the presence of an organism morphologically identical with the Friedlaender pneumobacillus. An examination of the conjunctiva of a dog, who was the constant companion of the boy, revealed the same organism. The patient was confined to bed for one week. His temperature was 102.3°. In Feb. there was a small ulcer on the conjunctiva, but the condition remained practically the same. In the middle of March the preauricular gland was opened; its pus was sterile, but smears from the conjunctiva still contained the organism. After this the eye condition rapidly quieted down and by April most of the follicles had disappeared, but the conjunctiva was of a dirty brown color. Treatment: argyrol and perchloride had no effect. Autogenous vaccine produced a slight local reaction. A 3% solution of methylene blue gave the best results. As regards the bacteriology he believes that the Friedlaender pneumobacillus has not been mentioned before as a cause for this condition. Under these circumstances it is suggested

that this disease is not caused by any specific organism, but is rather a lymphadenitis of the conjunctiva. GROUT.

The case reported by STERN (495, **Parinaud's conjunctivitis**) presented the characteristics of Parinaud's conjunctivitis. The right upper and lower lids were thickened, and granular deposits could be felt. The conjunctiva was covered throughout its entire extent by fairly firm nodules which differed from those of trachoma by their irregular form and the total absence of papillary swelling of the tissue of the mucous membrane. The glands in the right side of the neck were swollen. The benignity of the symptoms confirmed the diagnosis of Parinaud's conjunctivitis. The nodules in the conjunctiva as well as the swellings of the lymphatic glands underwent involution spontaneously in the course of  $1\frac{1}{2}$  months. Evidence was obtained that the condition was one of tuberculosis by implantation in a rabbit's eye, which gave a positive result.

GOURFEIN (492, **Pseudomembranous conjunctivitis of tuberculous origin**) adds another clinical picture to those already known of conjunctival tuberculosis. The observation was made on a child 6 years old, whose right eye had been affected 3 days. There was fever with high evening temperature; the conjunctiva of the upper lid was found on eversion to be covered with a false membrane, the rest of the eye was normal. Recovery was complete at the end of six weeks. Inoculation of animals with pieces of the membrane set up general tuberculosis. Diagnostic signs were the form of the fever and the swelling of the neighboring glands, which is almost never absent in conjunctival tuberculosis.

CAUSÉ.

WEIDLER (497, **Pemphigus of the conjunctiva**) tells of a Russian aged 70, who gave a history of failing vision for six months. In the right eye the iris was brown and the pupil sluggish. The lids were thickened and there was total symblepharon, the palpebral fissure being about 8mm wide, and the cornea was covered with a thick membrane. The left eye was similarly affected to a less degree. Spots of necrosis developed in the conjunctiva and there was ulceration of the cornea. The disease also affected the mucous membrane of the nose.

ALLING.

ISHIHARA (493, **Perlèche and blepharo-conjunctivitis both produced by diplobacilli**) describes perlèche as an eczematous disease of the angles of the mouth characterized by wet, whitish, swollen plaques that are smaller as a rule than the finger-nail. It is usually met with in young people chiefly as a result of uncleanliness, and is common in Japan. Ishihara has invariably found diplobacilli in this disease. Of 28 cases of diplobacillus conjunctivitis, 12 had perlèche. The diplobacilli can be carried from the disease of the mouth to the eye, where they will excite a typical blepharo-conjunctivitis.

TSCHIRKOWSKY (496, **Vaccine and serum therapy of diplobacillary conjunctivitis**) obtained improvement but no cures of diplobacillus catarrh from autogenous vaccines. Poly-valent vaccine was still less efficient. Improvement was likewise obtained from the use of serum. He thinks we must still rely on zinc, but that the best results will be obtained from a combined treatment.

STEPHENSON (494, **The duty of the practitioner in cases of ophthalmia neonatorum**) says that during the passage of the baby's head through the maternal canal infection seldom takes place, as the lids are water-tight and protected by a layer of vernix caseosa. The infective material is usually introduced into the conjunctival sac after birth by winking, or by the child rubbing its eye with a contaminated hand. For this reason, in addition to instilling a 1% solution of silver nitrate, the hands should be thoroughly cleansed at birth and the water that is used in the first bath should not touch the eyes. Treatment: Argyrol, 25%, has given satisfactory results and silver nitrate is resorted to only in stubborn cases. Peroxide of hydrogen in half or full strength is to be strongly recommended.

GROUT.

#### XIV.—CORNEA AND SCLERA. Reviewed by WOLFRUM.

498. BUCHANAN, LESLIE. A case of ulcerative keratitis caused by the bacillus of diphtheria. *Ophthalmoscope*, October, 1912.

499. CLAUSEN. Etiological, experimental, and therapeutical contributions to the subject of interstitial keratitis. *Arch. f. Ophthalm.*, lxxxiii., 3, p. 399.

500. DUNN, H. PERCY. A case of metastatic abscess of the sclera followed by perforation and prolapse of the iris. *Lancet*, Dec. 14, 1912.

501. GEBB. Keratitis parenchymatosa after traumatism. *Deutsche med. Wochenschrift*, No. 49, p. 2337.



502. HAAS. Change of refraction in a case of interstitial keratitis. *Annal. d'oculistique*, cxlviii., p. 318.

503. LACOMTE, FRANZ. A case of parenchymatous keratitis due to hereditary syphilis following linear extraction of cataract. *Annal. et bull. de la soc. de méd. de Gand*, Nov., 1912.

504. ORLOFF. Actinomycosis of the cornea. *Westn. ophthalm.*, Sept.

505. ROSENMEYER. The local use of neosalvarsan in the eye. *Muench. med. Wochenschrift*, No. 45, p. 2459.

506. ROY, D. Report of six cases of degeneration of the cornea in the same family (nodular keratitis). *Trans. Amer. Ophth. Soc.*, 1912.

507. TERTSCH. Keratitis punctata superficialis. *Ophthalmological Society of Vienna*, Nov. 11, 1912.

508. WEIDLER, W. B. Keratitis neuro-paralytica after removal of the Gasserian ganglion. *N. Y. State Jour. of Med.*, Oct., 1912.

BUCHANAN'S (498, Ulcerative keratitis caused by the diphtheria bacillus) patient, a laborer 69 years old, applied for treatment saying that his eye had been sore for some weeks past. Examination showed the eyelids to be congested with a moderate amount of secretion, and the palpebral conjunctiva to be congested, but with no membrane. The lower third of the cornea was occupied by an ulcer, the surface of which was slightly raised and composed of a shining yellowish material. The upper part of the cornea was clear, and blood could be seen in the anterior chamber. A scraping of the ulcer was taken and sent to the pathologist for examination, after which the usual treatment for the ulcer was followed, with but little success. Six days later, the report from the pathologist being positive, an injection of 4000 units of antitoxin was given, which brought about a cure. Buchanan believes this case to be of interest as the ulcer was apparently caused by the bacillus of diphtheria.

GROUT.

CLAUSEN (499, Interstitial keratitis) finds that 90% of all cases of this disease are due to syphilis, while tuberculosis is the chief cause of the remainder. Interstitial keratitis is the result of a disturbance in the nutrition of the cornea produced by a disease of the marginal network of vessels, induced by toxins circulating in the blood. This view is based on the results of experimentally produced interstitial keratitis. The presence of some few spirochætæ may be of no importance, while the disease of the marginal network suspected by v. Michel has been found anatomically by Elschning. This explains why arsenical and mercurial treatment is of so little

effect in this disease; in place of this a generally strengthening regimen is indicated. Wassermann's reaction is positive in about 80% of the cases, but the syphilitic origin of the disease is not assured by the positive result of the test.

The cornea in ROY'S (506, **Degeneration of the cornea**) cases showed various opaque spots which projected slightly from the surface with no inflammatory signs, and occurred in a mother and five children. The greatest number of cases which he has found reported in the same family was three. No treatment is of avail. The cases are exceedingly rare.

ALLING.

WEIDLER'S (508, **Keratitis neuro-paralytica after removal of the Gasserian ganglion**) study of the comparative merits of alcohol injections and excision of the Gasserian ganglion show that by the former method the patient is assured freedom from pain for from six months to years. In over 600 cases of the alcohol treatment recorded in the paper there was only one having serious keratitis, whereas in 70 Gasserian operations keratitis followed in a considerable number and enucleation was necessary in some.

ALLING.

ORLOFF'S (504, **Actinomycosis of the cornea**) patient complained of pain and impaired vision in the left eye. A year and a half before he had been struck in the eye by a clod of earth thrown from a horse's hoof. In the lower inner quadrant of the cornea, midway between the center and the margin, could be seen a slightly elevated, white neoplasm with a brownish stain. It was about 2mm in diameter, and was sharply differentiated in its structure from the cornea. There was an insignificant pericorneal injection, with slight photophobia and lachrymation. The vision of the left eye was 0.8, of the right normal. Diagnosis: keratomycosis of the left cornea. The threads of actinomycosis could be seen with the microscope, together with white staphylococci. Cultures of this fungus were injected into the cornea, but proved weakly virulent. Injections into the anterior chamber gave results that varied according to the method of procedure. The introduction of a colony visible to the naked eye into the eye of a rabbit or dog excited an iritis which passed away in four or five weeks. The clinical picture was quite different in another case. The patient got some hay dust in her eye, the sight of

which gradually failed. In the center of the cornea could be seen a superficial, blue red wound,  $1\frac{1}{2}mm$  in diameter. Its margins were sharply defined, and it was deepest at the periphery, while its center looked like a blunt cone. There were almost no symptoms on the part of the iris. Cultures revealed the same kind of actinomycosis as were present in the first case. Hence the author concludes that the same agent may excite two kinds of actinomycosis, an ulcerative and a mycotic, in which the tissue defect is covered by a layer of fungous threads and the necrotic portions of the cornea. It is also possible that the ulcerative form is a later stage of the disease and is produced by a casting off of the necrotic focus.

V. POPPEN.

TERTSCH'S (507, **Keratitis punctata superficialis**) patient, a man 25 years old, had suffered a long time from a congestive catarrh when spots appeared on the cornea that constantly changed their place and size. In the left eye these spots were arranged in a circle in front of the pupil, sending rays into the periphery. The surface over the spots was smooth and lustrous. In spite of the spots, which were of a bluish white, the vision was normal, so they must have been perfectly transparent. Tertsch ascribes them to oedema in the most superficial layers of the cornea, and thinks they must have been due to infection, although the bacteriological examination was negative.

In the discussion Kraemer mentioned a case with striae which Fuchs thought to be infiltrations along the nerves. The striae disappeared leaving no trace. The disease appears after a conjunctivitis, or after transparent blebs on the cornea that last several days. It commonly recovers without treatment. Meissner has observed that the disease is particularly apt to occur after a conjunctivitis that has been treated with silver. Reuss discussed the course of the disease which usually starts from a catarrh which shows a certain intolerance to silver. The appearance of the spots is not a result of the treatment. They may occur with eczematous keratitis, or without any preceding disease, and set in with photophobia, pain, and lachrymation. He has often noticed the changes in the position and size of the spots. Kraemer remarked that he had seen the disease after cases of conjunctivitis that were

not treated with silver. Tertsch had made the same observation as Kraemer. He claimed that four forms of keratitis punctata superficialis should be differentiated: (1) after a congestive catarrh; (2) after herpes of the cornea; (3) the miliary eruption of phlyctenulæ; (4) after a purulent conjunctival catarrh in which the eye had been tied up for a long time.

TERTSCH.

LACOMPTE (503, **Syphilitic parenchymatous keratitis following extraction of cataract**) observed the commencement of an interstitial keratitis three days after a cataract extraction in a girl 15 years old. He agrees with Antonelli that the localization of the morbid agent or toxine in the cornea is favored by the diminution of the power of resistance induced in the tissue by the traumatism.

DANIS.

GEBB (501, **Keratitis parenchymatosa after traumatism**) reports a case in which an interstitial keratitis followed a traumatism after an interval of 14 days.

In the course of an interstitial keratitis HAAS (502, **Change of refraction in a case of interstitial keratitis**) observed a marked change of the refraction, in which a myopia that had previously existed was transformed into emmetropia. He thinks that this resulted from a flattening of the cornea, and not from the relaxation of a spasm. The patient was a young man.

CAUSÉ.

ROSENMEYER (505, **Local use of neosalvarsan**) instilled a 2% solution of neosalvarsan into the eyes of a patient suffering from interstitial keratitis, and obtained an improvement and retrogression of the symptoms.

DUNN (500, **Metastatic abscess of the sclera**) reports a case in which a yellowish swelling that resembled an ordinary phlyctenule appeared in the limbus two weeks after the opening of a hæmatoma that became infected. The eye was normal in other respects. The swelling gradually increased in size and ruptured two weeks later. A prolapse of the iris, which occurred, was excised. Good recovery.

GROUT.

#### XV.—IRIS AND PUPILS. Reviewed by NICOLAI.

509. HEINE. **Tuberculosis and tuberculin.** *Med. Klinik*, No. 44-45.

510. KRAEMER. **Congenital cyclic disease of the oculomotorius.** *Vienna Ophthalmic Society*, May 20, 1912.



511. SUKER, G. F. Primary melanosarcoma of iris followed by extensive metastatic melanosarcoma of the liver. *Illinois Med. Jour.*, Oct.

512. WEEKERS. Pupillary reaction produced by adrenalin in meiosis due to paralysis of the ocular sympathetic. *Arch. d'ophthalm.*, xxxii., p. 610.

SUKER'S (511, **Primary melanosarcoma of the iris followed by extensive metastatic melanosarcoma of the liver**) patient was a woman of 29 who presented a small black spot on the iris after pregnancy. It was removed by iridectomy. It recurred in about two years, grew rapidly, and was again excised. A year later enucleation was performed. Six years from the original observation there was a recurrence in the socket; the orbit was completely exenterated and the sinuses cleared. Six months later a large nodule appeared in the orbit, and an exploratory incision over the liver showed the latter organ to be studded with bluish-black nodules. The patient died soon after.

ALLING.

HEINE (509, **Tuberculosis and tuberculin**) says that there are several kinds of nodules of the iris which may be considered clinically typical of tuberculosis in the absence of any other etiology, such as syphilis, and the reaction to old tuberculin is positive. The first of these are the little gray, bright glassy nodules in the minor circle of the iris; the second, tumor-like, roundish thickenings of the stroma near the margin of the ciliary body; the third, more inflammatory infiltrations in the region of the minor arterial circle of the iris. Among the atypical signs of tuberculosis of the iris and ciliary body he mentions deposits on Descemet's membrane, with sometimes a very slight heterochromia when the iris is caused to appear somewhat brighter as the result of a slight atrophy. When these deposits are present, every means should be tried to determine whether other signs of tuberculosis are to be found. In the second part of his article the author considers the value of the specific reactions for diagnosis. The general reaction is considerable and more characteristic than the local, the absence of which proves nothing against the presence of tuberculosis. Not alone the temperature but the pulse and the general disturbances are of importance.

KRAEMER (510, **Congenital cyclic disease of the oculo-motorius**) reports two cases of a pupillary phenomenon that

has been described as the jumping pupil (springende Pupille). The first patient was a man 21 years old, who had had since his fifth year total paralysis of his right eye with ptosis. He had been operated on for ptosis and strabismus without benefit. His left eye was perfectly normal. The diameter of his right pupil fluctuated in regular intervals between 8.5 and 3mm. There was no reaction to light or convergence. The second patient was a girl 15 years old who had had from birth a paresis of the right oculomotorius. The condition was similar to that in the first case. At the moment of contraction the upper lid lifted so that the palpebral fissure became wider than the other, and the angle of strabismus became less. This phenomenon had existed in the first patient before the operation. In both cases the dilatation of the pupil was slow, taking four seconds, the contraction sudden after some twitchings in the pupil. Observations were made of the time of the two phases when the patient looked in different directions, in various degrees of illumination, and of the influence exerted upon them by drugs. Closure of the lids seemed to arrest the dilatation. Pilocarpine diminished the mydriasis; eserine effected a strong contraction, yet was without influence on the duration of the phases; atropine paralyzed the contraction.

WEEKERS (512, **Pupillary reaction produced by adrenalin in meiosis due to paralysis of the ocular sympathetic**) reports three observations of a characteristic reaction of the pupil to the instillation of adrenalin in meiosis due to incomplete paresis of the sympathetic. In these cases the dilatation of the pupil caused by cocaine is not marked, or the difference from the sound side is only quantitative, while adrenalin dilates the pupil only when there is a lesion of the sympathetic. Hence this is a direct, pathognomonic, specific reaction. Weekers instilled one drop of the ordinary solution of adrenalin in each eye every five minutes; half an hour after the first drop had been instilled the pupil of the diseased eye was dilated, while that of the healthy one was unchanged. Doubtless there is a certain antagonism between the action of the adrenalin and the irritation of the sympathetic. The intravenous injection of adrenalin into animals produces a dilatation of the pupils, while the sympathetic when healthy inhibits the dilatation of the pupil when a small quantity is absorbed from the

conjunctival sac; the dilatation can take place only when the nerve is diseased. The effect on the pupil is greater or less in proportion as the paresis of the sympathetic is more or less complete. It seems to be certainly due to a direct stimulation of the smooth muscles.

CAUSÉ.

## BOOK REVIEWS.

**XVII.—Die Angiomatose der Retina. (von Hippelsche Krankheit.)** (Angiomatosis of Retina.) Sammlung zwangloser Abhandlungen auf dem Gebiete der Augenheilkunde. By Professor A. VOSSIUS, Giessen. Vol. IX., No. 1. Halle, C. Marhold, 1913. Price 1 Mark.

In this monograph the author gives a complete description of this rare affection. In twenty-two years and in about 100,000 patients Vossius has observed it only twice. The first case has been described by Fuchs in 1882, later on cases have been published by Magnus, Schleich, and others. But not until in 1911 when von Hippel was able to make a microscopical examination of an affected eye was the true nature of the disease revealed. In all, only twenty-two cases are reported. The disease consists in the main in the formation of true angiomata in the fundus; arteries and veins are greatly dilated, very tortuous, sometimes forming regular loops, and almost equal in color, so as to make it very difficult to differentiate between veins and arteries. As a rule they terminate in a reddish swelling, which microscopically proved to consist of a convolute of capillary vessels forming a regular network. Sometimes this area is prominent and in the shape of a berry. In the macula the formation of a star-figure is frequently observed, resembling an albuminuric retinitis, due to the presence of fat cells. In the course of this very chronic affection the retina degenerates, detachment follows, secondary cataract and shrinking of the eye terminate in blindness. The course of the disease extends over many years, from ten to fifteen, usually attacking people in their second or third decade.

The first of the cases reported by Vossius is that of a man



twenty-three years old. Vision of right eye: fingers at 2-3 meters. Left: normal. Strabismus divergens, with crossed diplopia. The anterior bulbus showed no changes. In the vitreous there were a few floating opacities. Veins enormously tortuous, arteries could be seen only with difficulty. Veins dilated to three or four times their normal caliber and so pale that they could easily be mistaken for arteries. The papilla was pale, its outlines indistinct. Between the blood-vessels were numerous white spots, such as are seen in retinitis albuminurica. Looking up, the retina looked blurred and whitish, and the very much dilated and tortuous blood-vessels could readily be seen, also round, bright red spots, which almost looked like hemorrhages. One very thick vein could be followed into one of these spots. After one month's stay at the clinic the picture was about the same, only clearer. The formation of loops and the termination of the veins in the red areas could very plainly be seen. In the left eye similar but only incipient changes had appeared. Later inquiries revealed that the patient was alive but blind for a number of years.

The second case is that of a girl, twenty-three years of age; she was the fourteenth of sixteen children. Some time in August, 1911, patient complained about severe headaches. A few days later she noticed a glimmering in her right eye and the following day that she could not see well. The left eye was defective through an injury received in childhood. In the right eye the following status was recorded: Papilla normal, except that the inner and lower margin was slightly blurred. The vessels of the lower fundus, also of the upper and nasal side, were normal. The superior temporal arteries and veins were swollen and tortuous. Both were bright red, with a broad reflex stripe. The artery, which showed an unequal dilatation, terminated in an egg-shaped balloon, of about four times the diameter of the papilla. The upper branch of the vein likewise disappeared in it, having first described a complete loop. In the region of the macula were many little, white stripes and dots, such as in albuminuric retinitis, but a regular star-figure was absent. After four months no change had been observed.

The fact, that the arteries and veins look so very much

alike, is probably explained by the anatomical findings. In the arteries as well as in the veins, von Hippel found a thickening of the intima and also of the adventitia and partly a wasting of the muscularis, so that even under the microscope a differentiation of the blood-vessels was difficult. The red areas, which first were mistaken for aneurisms, proved to be superficial angiomas, consisting of a mass of capillary blood-vessels with a foundation of glia tissue.

The cause of the disease is not known. It may be congenital, which assumption is substantiated by the observation of the affection in children of the same parentage.

SCHALCK.

**XVIII.—Eyestrain in Every Day Practice.** By SYDNEY STEPHENSON, Ophthalmic Surgeon to the Queens Hospital for Children, London. Editor of the *Ophthalmoscope*, London. The Ophthalmoscope Press, 24 Thayer St., 1913. Price 3s. 6d. net.

A man of Stephenson's reputation often considers an article on such pseudo-scientific a subject as eyestrain as rather unworthy of his efforts. But Stephenson has been so convinced, by increasing years and wide experience of the intimate connection between eyestrain and many so-called reflex neuroses, that he has collected together into a small volume a series of previous contributions on various phases of the subject, to the end that he may do his share toward convincing his colleagues of its importance.

His point of view is that of an open-minded conservative, and we can commend the little book not only to the general practitioner who wishes to form an intelligent opinion on the question, but to the ophthalmologists who think to account for all human ills through eyestrain and the neurologists who occasionally deny its very existence.

Stephenson is sure that eyestrain is more apt to manifest itself in persons who have inherited or acquired an unstable nervous system; in fact he thinks this element dominates the entire question. Women and children being more highly strung and physically weaker than men are more apt to suffer, while people who use their eyes habitually for close work are especially prone to it. No one questions to-day the close

connection between eyestrain and many chronic headaches, but its association with migraine is not so undisputed. In Stephenson's experience this connection is so intimate and constant that he urges the reader to be very chary of accepting the opposite view. He has come to consider spectacles an essential part in the treatment of most habit spasms though he is far from asserting that they will cure every case. Like the rest of us he has seen occasional cases of eyestrain simulating organic disease of the nervous system but on this score he is very conservative. He is sure that strain is more likely to occur when the error is small enough to be mastered by the ciliary muscle for the time being and that no authoritative opinion or correction can be made without full cycloplegia. While not intended to be exhaustive the book contains numerous references to significant contributions which make it a very adequate review of the whole subject.

E. M. ALGER.

**XIX.—Diseases of the Eye.** By GEORGE E. DE SCHWEIN-ITZ, M.D., Professor of Ophthalmology in the University of Pennsylvania. Seventh Edition. Thoroughly Revised. Octavo of 979 pages, 360 text illustrations, and seven lithographic plates. Philadelphia and London: W. B. Saunders Company, 1913. Cloth, \$5.00 net.

The appearance of a new edition of this standard American text-book of ophthalmology calls for comment principally to note the new matter which has been added. The new subjects are: Schiötz's Tonometer; Ophthalmodiaphanoscopy; Sporotrichosis of the Eyelids and Conjunctiva; Widmark's Conjunctivitis; Rosacea Keratitis; Epithelial Dystrophy of the Cornea; Marginal Degeneration of the Cornea; Blue Sclerotics; Progressive Atrophy of the Iris Layers; Exudative Retinitis (Coats' Disease); Angiomatosis Retinæ (von Hippel's Disease); Cysts of the Retina; Blindness from the Aryolarsenates; Siegrist's Method of Local Anæsthesia; Simple Trephining of the Sclera (Elliot's Operation); Reese's Muscle Resection Operation; Toti's Operation (Dacryocystorhinostomia). Attention is also drawn to vaccine treatment, to salvarsan, and to the bacterial (septic) origin of iritis and uveitis.

The eminent author is to be congratulated upon the judicious selection and critical presentation of the advances in recent years which bring to many excellent points of the book the feature of being quite up-to-date.

A. K.

**XX.—The American Encyclopedia and Dictionary of Ophthalmology.** Edited by CASEY A. WOOD, assisted by a large staff of collaborators. Fully Illustrated. Volume I., A to Azoviolett. Pp. 727. Chicago: Cleveland Press, 1913. Price, cloth, \$6.00 per volume.

The prompt appearance of the first volume of this monumental work reflects great credit upon its indefatigable editor and his collaborators. The arrangement of the subjects is alphabetical. The book is also a dictionary of words and phrases in English, Latin, French, German, and Italian, which are of use to the student of ophthalmology.

Some of the longer articles are: After-Cataract, by Myles Standish; After-Treatment of Ophthalmic Operations, by E. C. Ellett; Ali Ben Isa, by T. M. Shastid; Alphabets and Literature for the Blind, by F. Park Lewis; Anatomy (Gross) of the Human Eye, by A. N. M.?; Anæsthesia in Ophthalmic Surgery, by Wendell Reber; Arc Lights and Their Effect on the Eye, by C. A. Wood; Aristotle, by T. M. Shastid; Artificial Eyes, by C. A. Wood.

The many subjects and terms described show the enormous task which the author has undertaken and is apparently solving with success. The convenience of a reference book of this character is of course apparent. The book-making and illustrations are excellent. We look forward with great pleasure to the rapid appearance of the remaining volumes.

A. K.

**XXI.—Julius Hirschberg's Ausgewählte Abhandlungen** (Selected Papers) (1868–1912). Presented on the occasion of his 70th birthday in the name of his pupils by Oscar Fehr and Wilhelm Mühsam. With illustrations and a portrait. Pp. 864. Leipzig. Veit & Co., 1913. Price, 30M.

This publication of Professor Hirschberg's writings in a single volume has its inception from the German custom, of honoring a noted scientist on the occasion of his 70th birthday.



The book furthermore gains in interest from the fact that Professor Hirschberg has made the selection of his writings himself. The articles have been grouped according to their contents under the following headings: I.—Relation of the Eye to General Diseases; II.—Operations on the Eye; III.—Diseases of the Eye and their Treatment. A glance at the subject index shows how completely the entire clinical field of ophthalmology has been covered, and one cannot help but marvel at the enormous literary labor expended. It must be a great satisfaction to the author to see the large volume which the collection of these papers makes, especially as the subjects are always important and the form of expression is concise, a feature which is unfortunately not generally a characteristic of German scientific writing. We sincerely hope that the eminent author will continue to contribute to ophthalmic literature for many years to come.

A. K.

**XXII.—The Ophthalmic Year-Book.** Volume IX. Edited by Dr. E. JACKSON, assisted by T. B. Schneideman, W. Zentmayer, W. H. Crisp, C. A. Wood, W. Reber, H. S. Gradle, R. H. Elliot, H. W. Aufmwasser, and M. Wiener. Illustrated. Pp. 518. Herrick Book and Stationery Co., Denver, Colo. 1913. Price, \$5.00.

It is a great pleasure to welcome the reappearance of the Year-Book. The present volume gives a digest of ophthalmic literature for 1911 and 1912, so that there is no interruption in the series. Only papers of importance have been reviewed. It is now published with assistance from the Knapp Testimonial Fund of the Section on Ophthalmology of the A. M. A. The importance of keeping up with the literature is so evident and the task is so facilitated by these reviews that Dr. Jackson's year-book should be a much-used occupant of every ophthalmologist's library.

A. K.

**XXIII.—The Accessory Sinuses of the Nose: their Catarrhal and Suppurative Diseases.** By Dr. ROSS HALL SKILLERN, of Philadelphia. Copiously illustrated. Pp. 389. Philadelphia & London: J. B. Lippincott Co., 1913. Price, \$5.00.

The importance of the nasal accessory sinuses is no longer

questioned, though a thorough treatment of their disorders had not been written in the English language until the appearance of Dr. Skillern's book. The author treats his subject first, by an excellent presentation aided by many illustrations of that most difficult subject, the anatomy. This is especially of the greatest importance to the ophthalmologists whose estimation of orbital conditions depends so much upon the correct knowledge of the topography of the adjoining nasal cavities. The etiology, pathology, symptoms, diagnosis, and complications of sinus disease conclude the heading of general considerations. In the second or special part each sinus is taken up in turn with reference to anatomy, etiology, symptoms, diagnosis, and treatment. The orbital complications, the relationship of the optic nerve to the posterior ethmoidal cells, the frequent association of ethmoiditis and lachrymal disease are fully described. The book, in short deserves the careful study of every ophthalmic surgeon desirous of information on the relation of the nose and the eye.

A. K.

**XXIV.—Diseases and Injuries of the Eye.** A Text-book for Students and Practitioners. By Dr. W. G. SYM of Edinburgh. Crown 8vo, cloth, with illustrations in color and in the text. Pp. 493. The Macmillan Co., 64 Fifth Ave., New York. 1913. Price \$2.50 net.

This is an excellent and well-balanced short text-book on the eye, adapted for the purposes of students and general practitioners. It is written in an original and attractive manner by an experienced clinician. We are glad to see that the author favors the routine examination of refraction without a mydriatic. The text is illustrated by a sufficient number of illustrations, and the color pictures of external diseases and fundus conditions are excellent. The book is a worthy addition to the group of short text-books in English on the eye and it is a pleasure to recommend it.

A. K.

**XXV.—Prisms: Their Use and Equivalents.** By Dr. JAMES

THORINGTON of Philadelphia. 118 illustrations. Pp. 144. Philadelphia, P. Blakiston's Son & Co., 1012 Walnut St., 1913. Price, \$1.50.

In addition to the optical properties of prisms their use is described in the diagnosis and treatment of muscular imbalance of the eye. The book is a fitting companion to the author's well-known books on refraction and enjoys the same clearness of definition.

A. K.

#### MISCELLANEOUS NOTE.

The NEW YORK OPHTHALMIC and AURAL INSTITUTE of 44 and 46 East 12th St., New York, which was founded by Dr. Herman Knapp, in 1869, will move on October 1st to 57th St. and 10th Ave., where a new fire-proof hospital building has been erected. The new hospital will be given over solely to the treatment and study of eye diseases; the other departments will be discontinued. The name of the new hospital will be the *Herman Knapp Memorial Eye Hospital*.



## ARCHIVES OF OPHTHALMOLOGY.

### SOME NEW INSTRUMENTS FOR MEASURING VISUAL-FIELD DEFECTS.<sup>1</sup>

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*(With seven cuts in text.)*

- I.—DISKS, GRADUATED AREAS.
- II.—THE COLOR INTERCHANGER.
- III.—THE PLAIN MONOCULAR BLINDER.
- IV.—THE COMBINATION BLINDER AND MACULAR SELECTOR.

THE comparatively recent advances in brain surgery have brought, among numerous other requirements, an ever increasing demand for more accurate and more complete visual-field examinations. In the neurological surgical clinic of Dr. Harvey Cushing, on whose staff I have had the pleasure of acting as assistant in the capacity of ophthalmologist for the past year and a half or more, not infrequently as many as six or seven accurate fields have been required in one day. In many cases daily fields are required, which should and will check in the unchanging regions of the field, proportionately to the degree of care and accuracy applied in making the examination.

In general, mechanical perimeters have been tried and found wanting for three major reasons. First, their accuracy can seldom be depended upon when the field defect approaches close to the center where greatest accuracy is most required

<sup>1</sup> Presented before the New England Ophthalmological Society, March 11, 1913.

and is most valuable. Secondly, they are altogether too time-consuming in that only one reading with one disk on one arm may be taken at a sitting, thus multiplying the necessary number of disk settings, to take a full color field, by about eight, unless the questionable habit is resorted to, of reaching into the field of vision and changing the disk after each reading. Lastly, there is no means of taking all color readings rapidly in the same color phase time, without, in changing the colors, giving the patient some clue that a change has been made. Numerous other minor objections need not be taken up in a short paper of this nature. In a word, as Dr. Cushing at one time aptly remarked, "good perimetry depends not so much on the perimeter as on the man behind the perimeter."

Thus the plain perimeter has become our instrument of choice when the most painstaking, accurate, and rapid work is demanded. While the requirement in regard to the perimeter is readily satisfied by the market, the requirements in regard to accessory instruments for field measurement are not as well fulfilled. Without taking up the numerous faults of these obtainable devices we may render certain shortcomings somewhat obvious by considering some of the conditions which we believe should be fulfilled.

#### I.—DISKS, GRADUATED AREAS.

Flat or nearly flat objects are preferable to spheres, cubes, and prisms in order that they may be as nearly as possible in the same focal plane as the fixation point and present the same area, at a constant angle and illumination. They should have a mat or reflexless surface, rather than glazed, glass, or celluloid covered surfaces, which at critical angles may give a strong reflex affording neither a color nor form test. Further, the white disks especially should be essentially rimless. Only a knife-edge rim should be used, simply as a protection to the mat surface of the disk. The handle of the disk should be as narrow and difficult to see as possible. These two last points avoid reports on disk rims and handles on the part of the patient, and also avoid constant cautioning against the same on the

part of the examiner, since, in getting the form field, disk rims and handles, if large compared with the test object, may be noted to move before motion of the test object is noted.

With regard to the disks themselves, we think it is important that they should be referred to in terms of areas, in order to avoid confusion. For instance, we have been accustomed to speak of fields taken with a 1cm disk, but while one observer uses a square disk 1cm on a side, another uses a round disk of 1cm diameter. While these are used indiscriminately the area of the round disk is approximately three quarters that of the square disk. This is obvious from the formulæ for their respective areas. Thus, if we let (d) represent at once the diameter of a circle and the side of a square, then the area of the circle is represented by  $\pi (\frac{d}{2})^2$  or  $\frac{\pi}{4} d^2$ . But  $d^2$  also represents the area of said square. Thus obviously the area of the circle is practically  $\frac{3}{4}$  that of the square. To further accentuate this discrepancy the diagonal of the square is the  $\sqrt{2}$  or 1.4 + times as great as the diameter of a circle of same diameter as the side of the square, so that, due to the area distribution, the square offers greater visual stimulus than the circle even if their respective areas were the same.

As to the color tints themselves, probably the best source for a fixed standard is the solar spectrum. Mat papers may be selected which very closely match the blue or "F" band,  $486\mu\mu$ ; the red or "B" band, about  $686\mu\mu$ ; the green or "E" band, about  $526\mu\mu$ . It is practically impossible to demonstrate that very small variations in color shades give differences of readings that may be recorded on the ordinary chart.

Fig. 1 may give an idea as to the manner in which the disks are arranged. For convenience and economy of space, each



FIG. 1.

end of the rod carries a double disk set at right angles to that on the other end, so that only one disk at a time may be seen by the patient.

Having decided then that circular disks mentioned in terms of areas were desirable, it remained further to be determined what particular set of areas would be most satisfactory. Guidance was obtained in this matter from a tabulated (Fig. 2) study of the measurements of the more commonly used

$d = \begin{cases} \text{diam. of circle} \\ \text{or} \\ \text{side of square} \end{cases}$	$\frac{\pi d^2}{4} = \text{Area of circle}$	$d^2 = \text{area of square}$	$\sqrt{\frac{d^2}{\pi}} = \begin{cases} \text{radius of circles} \\ \text{having same area as unit} \\ \text{and area ratio of 1:4} \end{cases}$
$\frac{1}{8}$ cm	$\frac{\pi}{64 \times 4} = 0.01226$	$\frac{1}{64}$ sq. cm.	$\sqrt{\frac{1}{64 \times \pi}} = .0705$ cm.
$\frac{1}{4}$ cm.	$\frac{\pi}{64} = .0492$	$\frac{1}{16}$ sq. cm.	$\sqrt{\frac{1}{16 \times \pi}} = .141$ cm.
$\frac{1}{2}$ cm	$\frac{\pi}{16} = .1964$	$\frac{1}{4}$ sq. cm.	$\sqrt{\frac{1}{4 \times \pi}} = .282$ cm.
1 cm	$\frac{\pi}{4} = .785$	1 sq. cm.	$\sqrt{\frac{1}{\pi}} = .564$ cm.
2 cm.	$\frac{\pi}{1} = 3.1416$	4 sq. cm.	$\sqrt{\frac{4}{\pi}} = 1.127$ cm.
4 cm	$\pi \times 4 = 12.566$	16 sq. cm.	$\sqrt{\frac{16}{\pi}} = 2.254$ cm.
3 cm	$\frac{\pi \times 9}{4} = 7.14$	9 sq. cm.	$\sqrt{\frac{9}{\pi}} = 1.69$ cm.

FIG. 2.

disks and actual experience with cases where different sizes of disks are necessary for a complete examination. Rönne<sup>1</sup> has shown in Bjerrum's clinic the value of different-sized small disks in cases of glaucoma and optic atrophy, and believes that a field examination with only one size of disk is just as inadequate as visual examination would be with only one size of letter. I have extended this method to the examination of hypophyseal cases of bitemporal hemianopsia before and after operation, particularly, and, in general, to the examination of cases of anterior lesions or progressive posterior lesions (cf. Fig. 7). Much more accurate information as to the state

<sup>1</sup>Rönne: "Über die Form der Nasalen Gesichtsfelddefekte bei Glaukom," *Arch. f. Ophth.*, lxxi., 1909, p. 52; "Gesichtsfeldstudien über der Verhältnis zwischen der peripheren Sehschärfe und dem Farbensinn speziell die Bedeutung für die Prognose der Sehnervenatrophie." *Klin. Monatsbl. f. Augen.*, 1911, p. 154.



of preservation and even prognosis may be gotten with a set of graduated disks such as I have used, which bear much the same relation in size to the small disks of Rönne as the Theobald probes bear to the smaller previously used probes. With these larger graduated disks progressive changes in the defective fields may be studied when they may not be detected at all with the smaller disks.

Altogether, for numerical and practical reasons, a circular area of one square centimeter was taken as the unit size, and above and below this size the ratio of areas was maintained at 1:4, so that the area of any disk was  $\frac{1}{4}$  the area of the next larger disk, or four times the area of the next smaller disk. The sizes range from  $\frac{1}{16}$  sq.cm to 16 sq.cm, with one extra size, 9 sq.cm, which is often useful. The smallest sizes are very useful as tests for central color scotomata and for making out more definitely relative scotomata either centrally, paracentrally, or peripherally for larger-sized disks.

## II.—THE COLOR INTERCHANGER AND INTERLACING TESTER.

For the great majority of cases or for preliminary examination of all cases, a routine instrument, which would carry and expose at will, interchangeably without interval, the commonly used or normal-sized disks ( $\frac{1}{4}$  sq.cm), was desirable. Among further desirable features would be an instantaneous, if possible, interchanging of colors without any noise or associated movement on the part of the instrument or examiner whereby the patient could learn that a change had taken place. Also, for previously mentioned reasons, the white spot should be as nearly rimless as possible. The instrument should be as narrow as possible in order to examine areas right up to the fixation point, and the operator should be able to know at all times what color is being displayed without looking at it.

A simple instrument designed to meet these requirements is represented in Fig. 3. Roughly the instrument suggests, as

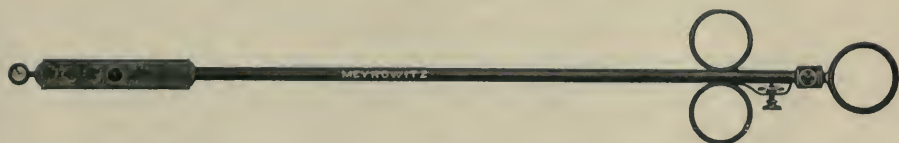


FIG. 3.

has been remarked on demonstration, the general arrangement of a tonsillotome. The movable rod carries at the end an essentially rimless white disk, and farther back the colors, which abut each other to get quickest possible interchanging, are protected by slight lateral rims. On the handle end of the rod are notches which lightly engage a tension spring each time a color appears at the central display opening. The spring may be regulated in tension by a double set screw, so the click on engaging a notch is not heard at all but barely felt by the operator. At the two end stops for colors no click of course is necessary. To make the white spot appear requires more force than to display the colors, since in so doing more tension is put on the spring by means of an elevating cam. The ring on the handle for the thumb is on a swivel, so that any part of the perimeter is readily reached if the fingers are entered on the same side as the colors appear. In getting the form field the white spot is made to precede the rest of the instrument, so that the first motion noted is surely not due to the handle. The colors ride very close to the beveled opening, so that practically no shadow is cast to cut down the area of the disk, and a slight allowance is made in the size of the opening to offset the slight shadow present. The disks, protected as they are, do not fade or get soiled for months, and when necessary they can be replaced by loosening a small thumb-screw on the handle, which allows all parts to be separated when the protective back at the end is slipped off.

Such an instrument serves a double purpose. First as to speed and ease. The entire eight readings for a form and color field may be rapidly taken, checked and rechecked at each setting of the perimeter, and throughout the examination it is not necessary to change one's position at the right or left of the perimeter, since the measurements may be made with one hand and recorded with the other, without interruptions ordinarily experienced in changing disks. With some patients of minor intelligence it may be necessary to run rapidly around the form field separately where there is reason to suspect any confusion. The rapidity with which a complete field may be accurately taken is a great advantage when there is considerable suffering and nervousness, as is frequently the case with patients who most need a field examination and are least able,

on account of their physical condition, to make accurate observations for any length of time.

Secondly, it serves as a special test for the presence or absence of the phenomena of color interlacing or inversion. Certain critical tests may be made in questionable cases. One may carry the red color to the periphery for red and, without intimation to the patient or with a question as to whether the color disappears or not, noiselessly and quickly change to blue, when, if inversion is present, there will be no color called, while ordinarily it is at once noted. Green may be introduced to farther reduce the chance of guess. Again the blue periphery may be found in the same way and the red interchanged as before, with the same question, when, if interlacing is not present, the color will have to be brought nearer the center before it can be named. Also the colors may be continuously interchanged as the instrument is carried slowly along the arc, noting which color is first called. Color interlacing is not at all difficult to get even in normal cases when one color field at a time is taken, as is necessary with many automatic perimeters, or even with slow changing of colors, especially when the patient is allowed a large percentage of guess, of which they are usually glad to take advantage.

### III.—THE PLAIN MONOCULAR BLINDER.

The usual method of blinding one eye, where a field is to be taken on the other, is to tie on a bandage or eye pad of some sort. The chief difficulty with these is that they are time-consuming in proper application, that they may obstruct the vision over the bridge of the nose or allow some visual leakage over or down the side of the nose. While a bandage or pad may be suitably adjusted if time be taken, they are also useful for other purposes, so that the chances are when one is ready to take a field it is suddenly noted that these things have been pressed into emergency service elsewhere or have become soiled or dirty, so that one must hasten after another makeshift. Probably everyone who has taken fields has experienced some of these difficulties, so that a sterilizable device which could be instantly applied and would

in no wise discomfort or distract the attention of the patient by any effort on his part, would seem desirable.

Fig. 5 shows such a device except that the plain blinder is made without the macular selector arrangement attached. Thus it consists of a hemispheroidal shield which fits the orbital rim of the eye and is held in place by a light spring over the head. The head spring is attached to the shield by means of a swivel joint so that the shield readily takes any position comfortable to the patient, and allowing free motion of the eye, at the same time completely excluding all light. The spring is readily bent to fit extreme cases, such as microcephalus, hydrocephalus, or elaborate coiffeurs. We have yet to find a case in which it could not be used. The device is black nickeled and is readily sterilized by alcohol and ether or even boiling if necessary.

#### IV.—THE COMBINATION BLINDER AND MACULAR SELECTOR.

When central vision is lost or considerably damaged the difficulty in taking fields which will check becomes very great, due to lack of fixation, or a continuous seeking motion. The majority, it seems, of such cases are monocular, or at least fairly good fixation remains in one eye. It would appear then that some special method or device for examining such cases of monocular central scotomata would be desirable. For such cases the instruments represented in Fig. 5 have proven very satisfactory. The principle is simply to use the macula of the eye in which it is preserved to maintain fixation of the eye in which the macula is damaged.

The blinder described above is provided with an opening on the nasal side of the shield at such a place that when the eye to be examined is in the proper position on the perimeter the other eye may also be able to fix the center of the perimeter through this opening. Over this opening is fixed a device which is provided with a light tight shutter. When this shutter is closed, the instrument may be used in routine manner as a plain blinder. But when the shutter is open, one of two other attachments may be affixed and firmly held in place over the opening. With either one of these attachments fixation may be obtained from the covered eye through the



opening in the shell of the blinder. (Fig. 4 shows a case for holding all these instruments, together with charts and colored

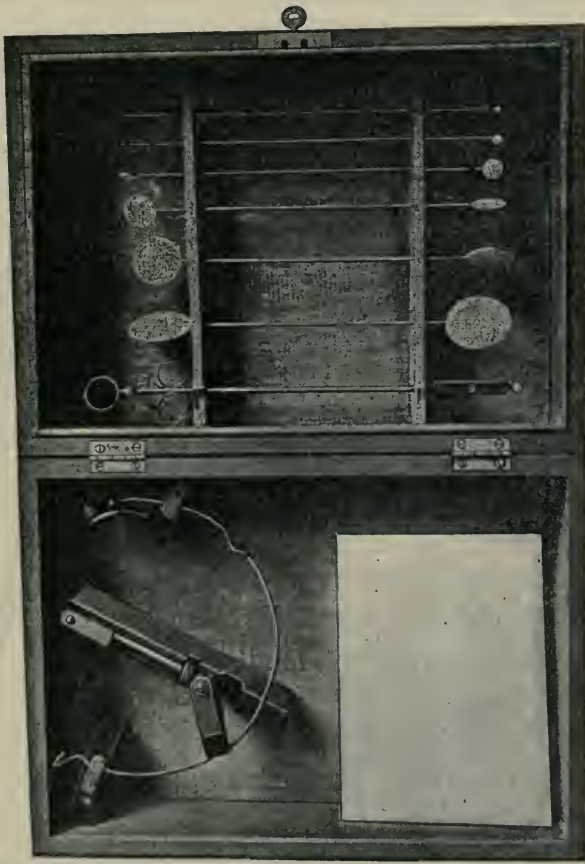


FIG. 4.

papers, in a convenient manner, protected from light and dust.)

The first and simplest of these attachments is a conical tube (Fig. 5), about two inches long, with an opening of about 2mm at the small end, through which the patient may see an area of a little over 1 sq.cm about the fixation point of the perimeter. The base of this tube is fitted with sleeve which, when clamped to the blinder, brings the base of the conical

tube against a bayonet spring. The result is that the tube can be very easily moved in a limited ball-and-socket fashion, but is maintained by the tension of the spring in any position



FIG. 5.

in which it is placed. This combination, although it has certain limitations, has given very good results even with clinical cases of very low intelligence. In such cases the patients may be given the tube alone and be told to look through it at various small fixed and moving objects, and in a few minutes they can be relied upon to find and fix on any point.

One must expect to give considerably more time to get an accurate field on a central scotoma case than on an ordinary case. In order to determine whether or not the eye to be examined is in proper alignment, one may carry a small light along the perimeter and note the corneal reflex at the center. If there is apparently some deviation, one may resort to fusion

or other tests. Thus by use of a cross made of wire attached at the center of the perimeter, or by use of narrow strips of adhesive stuck on to form a cross in the same way, it may be determined whether the small central part of the cross seen through the tube is continuous with the arms of the cross seen by the eye being examined. If there is a low grade of strabismus, a second eccentric fixation point or cross on a movable stand, to be observed through the tube, may be used to draw the eyes into such a position that the corneal reflex of the eye to be examined becomes central with regard to the center of the perimeter. However, if there is considerable strabismus, or if one margin of the scotoma runs through or close to the area seen through the tube, or if there is particular reason for examining just that part of the nasal field obstructed by the conical tube, then the examination by this method will have given approximate measurements which can be further checked and corrected by use of the second of the above mentioned attachments.

This second attachment (Fig. 5) suggests a small retinoscopic mirror, mounted so as to have motion in any direction about the center of the mirror, and is provided with an expansion sleeve which fits snugly into the receptor device over the shutter on the blinder shield. The opening in the retinoscopic mirror is also provided with a small shutter which, when necessary, will cut off direct observation of the center of the perimeter. The later models have a thumb-screw, not shown in the cut, on one end of the mirror axis, by means of which all the motions of the mirror are more easily controlled. Here again some time must be spent in practice observations by the patient. He may be asked to take the mirror and note how an object at one side may be reflected into the eye, while at the same time he may see objects straight ahead through the opening in the mirror, and also some parts of the objects in the unaffected field of the other eye. When, by adding one image after the other, all three images may be seen and more or less superimposed at will, we can proceed to the perimetric arrangement schematically represented in Fig. 6, which is drawn approximately to scale.

The eye to be examined is placed at the center of the perimeter. The combination blinder and macular selector (mirror

attachment) is then arranged over the other eye and will be found to lie entirely behind the shadow represented by the line (c) of the nose (n). With the mirror placed vertically at right angles to the line of vision, the patient then locates the center of the perimeter (o) through the opening in the mirror

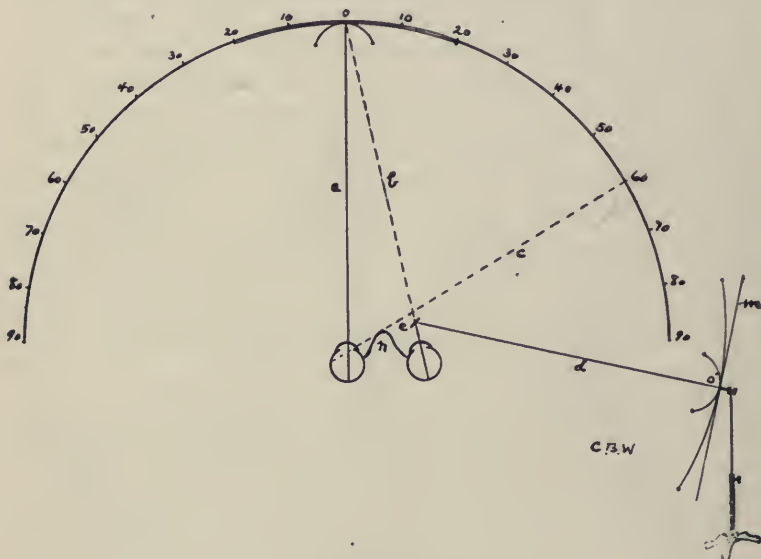


FIG. 6.

while the other eye is kept closed. The mirror is then slowly rotated, while the patient remains fixed on the center, until the secondary spot ( $o'$ ), which has been placed approximately in the correct position, is seen. To aid this adjustment, if at any time either object disappears for any reason, it may be readily found again by holding a dark card so as to cut off the visible object until the other object is found. In this way and by fine movements of the mirror or of the stand supporting the secondary fixation point ( $o'$ ) the latter may be very quickly superimposed on the central fixation point ( $o$ ). At this stage the eye to be examined may be uncovered and if no muscular imbalance or fusion suppression interferes, the field may be at once taken. Of course, the distance of the secondary fixation point ( $o'$ ) and the distance of the primary fixation point ( $o$ ) from the center of the mirror ( $e$ ) must be equal.



That is, (d) must equal (b), in order that the two fixation objects may appear of the same size and be seen with the same accommodative effort.

A very considerable aid in effecting these adjustments, as well as for testing the condition of the fusion ability, may be found in a certain arrangement of the fixation points. Two right-angle crosses are made of stiff wire. The arms of equal length are bent to the same curvature as the perimeter arc and soldered together at their middle points, which are also the fixation points. At these points may be placed a small capital letter, "A" for instance, since better fixation may be obtained by having something more definite to look at than a blank spot. The wire ends may be tipped with small balls to make them more noticeable, though of course it is not necessary. Another helpful, but not absolutely necessary thing, is to color one cross differently from the other. Complementary colors may be used which will give their characteristic color phenomena on superimposing them. Perhaps the most satisfactory arrangement is to use a white cross on the secondary fixation point (o'), and a yellow or other color not used in the examination for the primary fixation point (o) cross. Either or both crosses may be removed from the fixation points or left during the examination, after fixation has been established, and may again be replaced if necessary for again testing fixation. They may also be rotated to any position most suitable to the particular form of field being examined, though usually they are used in the horizontal vertical position. One can do very well without the use of crosses at all, or narrow adhesive strips may be quickly laid on the perimeter and on the black disk (m) surrounding the secondary fixation point (o').

This method of examination has advantages over the first mentioned method, in that somewhat higher grades of strabismus may be attempted and the central region and all parts of the periphery may be examined.<sup>1</sup> In cases of strabismus the

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<sup>1</sup> This method of obtaining fixation may also be used to obtain the hemiopic pupillary reactions of an eye which has lost central fixation due to the presence of a central scotoma, provided fixation is good in the other eye. A large black sheet of paper must be used to prevent anything but light of constant intensity from entering the fixing eye. Reference to this

secondary fixation point (o') is moved in the proper direction to draw the eye to be examined to such a point that the corneal reflex from the center of the perimeter is in the proper place. By also moving the mirror (e), a still greater degree of deviation may be effected. Further, most eyes will allow a certain range of motion of the shield itself. In extreme cases with limited mobility of the eyes, or difficult eccentric fixation, it may be necessary to turn the patient's head until the proper relations are established. But in one group of extreme cases—marked divergence—it has been found possible to rotate the shield so that the opening comes on the temporal side and then to proceed as usual. Indeed it is not infrequently necessary, particularly in hypophyseal cases and anterior lesion in general, to use all of the described instruments before completing the examination.

A single characteristic instance of such a case may suffice here. Fig. 7 shows a field in a stage of recovery, subsequent to opera-

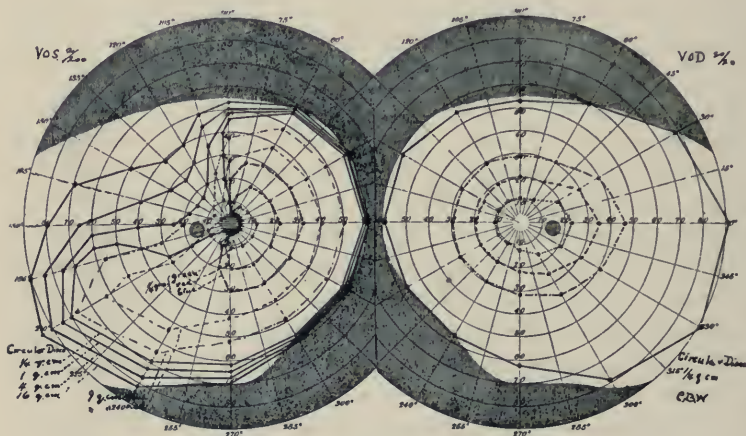


FIG. 7.

tion, from complete bitemporal hemianopsia before operation. The central scotoma renders fixation on a small spot very

application is made in a paper presented at the meeting of the American Medical Association, June, 1913. Walker: The topical diagnostic value of the hemiopic pupillary reaction and the Wilbrand hemianoptic prism test with a new method of performing the latter.

poor, and the field defect requires the use of graduated disks of different sizes to complete the examination, which would otherwise be about as incomplete as a visual examination with one fixed letter.

Although field taking is, at best, commonly regarded as a matter of considerable labor, not to say drudgery, we have found that with a handy set of instruments such as described, the task becomes much less nerve-racking and, when something more than an approximate estimate of visual peripheries is required, much more productive of desirable information.

## ON SOME FORMS OF RETINAL TUBERCULOSIS.<sup>1</sup>

By ARNOLD KNAPP, M.D., NEW YORK.

(*With two colored drawings.*)

IN addition to the cases of retinal periphlebitis,<sup>2</sup> which occur in adolescents and in which hemorrhages, either retinal or vitreous, predominate the clinical picture, and to the cases of deep massive retinal exudation, which resemble somewhat the retinitis exudativa as described by Coats, there is a group of retinal lesions in the tuberculous where the process seems to be localized in the more superficial layers of the retina. Illustrative of this condition, I wish to report on the two following cases:

CASE I.—A. C., nineteen years old, was seen on October 29, 1912, because the sight in the right eye had been blurred for several days. He was a well-built, healthy-appearing young man, who had been working in a lumber yard and had had no particular illness. He was admitted to the hospital on November 6th. V. O. D. =  $\frac{5}{200}$ , central scotoma, O. S. normal; urine normal, physical examination negative, Wassermann and luetin tests negative. The ophthalmoscope showed a swollen and inflamed optic disk; the swollen nerve-head seemed to be displaced by an ill-defined chorio-retinal area up and in, surmounted by a small hemorrhage (inverted image). Up and out next to a blood-vessel there was a superficial round white focus; another smaller though similar patch was to be seen below, a short distance from the disk. The macular region was occupied by a perfect star-like radiating figure; the spokes were composed of glistening, silvery interrupted lines.

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<sup>1</sup> Read at meeting of American Ophthalmological Society, Washington, D. C., June, 1913.

<sup>2</sup> ARCHIVES OF OPHTHALMOLOGY, vol. xlii., No. 1, 1913.



As there was no fever, a diagnostic injection of old tuberculin was given. After 3mg the temperature rose to 100.4° F., with a distinct arm reaction. On examining the fundus, two days later, November 15th, many small, round, white areas were seen about the disk and the large retinal focus (Fig. 1); these were all deeply placed in the retina and distinctly under the retinal vessels. The regular tuberculin treatment with the bacillary emulsion was then begun by Dr. E. Török. November 20th, the swelling about the disk has disappeared enough to disclose a circumscribed white area about one-half the diameter of the disk. This was superficially placed in the retina. More small white areas had appeared in the direction of the macula. The radiating lines about the macula were thicker and some had changed to irregular exudates. After another week the exudates, both the large and the many small ones, began to be absorbed; they grew fainter and smaller. On December 25th the main focus was nearly gone, and a distinct connective-tissue formation in the retina in this situation was taking place. Many of the small foci had disappeared. The macular figure was reduced to a few radiating lines and irregular patches. On January 24th the small foci had disappeared without a trace; connective tissue indicated the site of the previous large retinal exudation. In the macula there were a few shiny dots and irregular areas. On March 7th nothing remained in the macular region except some shiny dots and some superficial pigmentary changes. The vision had improved to  $\frac{16}{200}$ , but there remained a central scotoma.

The large exudate near the disk is not an example of the well-known choroidal process which, when situated near the disk, causes so much optic neuritis as to mask the choroidal origin of the process, and which recently has been called chorio-retinitis juxtapapillaris by Jensen. The process was always superficial; there never were any choroidal changes; it healed with the formation of superficial retinal connective tissue. This distinctly retinal exudate resembles the pictures of tubercle in the retina, such as is beautifully illustrated in Adam's recent *Ophthalmoskopischer Atlas*, p. 88. The star figure in the macula did not resemble the macular changes which are observed in albuminuric retinitis where the radiating lines are composed of much heavier, more intensely white exudates like "spattered paint." In this case they were glistening, delicate, silvery, like those observed in optic neuritis.

Star-shaped changes in the retina are rather the expression of a lesion in certain definite layers of the retina, than the characteristic of certain diseases.

The crop of small white exudates like miliary tubercles, appearing after the diagnostic tuberculin injection, is particularly interesting. These dots are frequently observed in various forms of retinal tuberculosis, and are often situated at the periphery of a large tuberculous chorio-retinal focus (see Haab's *Ophthalmoskopie*, p. 80). It is uncertain whether the tuberculin injection made these small foci ophthalmoscopically visible, or whether they represent the dissemination of the original focus. The rapid and continuous improvement under specific tuberculin treatment (no other treatment was purposely given) confirms the diagnosis of a tuberculous lesion.

CASE II.—A. F., twenty-two years old, was seen on October 24, 1912, because of failing sight in the right eye, which had existed for one week. The patient had never been seriously ill; family history and physical examination negative. The Wassermann test was negative and the urine was normal. V. O. D. =  $\frac{8}{200}$ , central scotoma extending temporally to the blind spot; O. S., normal. The ophthalmoscope showed a white exudate composed of rounded areas which surrounded the course of a macular vein (Fig. 2). This vessel was unevenly dilated, and there were two small hemorrhages on the exudate. The 3mg diagnostic tuberculin injection was followed by a temperature of 100.6° F., with an arm reaction, but no definite ocular reaction except increased vitreous haze. The regular tuberculin treatment was begun on November 3d, and the patient was kept in bed. No other treatment was instituted. The exudate steadily enlarged by the formation of rounded and slightly prominent foci along the distribution of the vessels. From the macular region the process passed up and out to the superior temporal vein, then under and along this vein, spreading from day to day, back to the disk, then up along the distribution of the superior nasal vessels. The rounded exudates were always situated beneath the retinal vessels. The surrounding oedema and swelling were sometimes so great as to suggest a retinal detachment. Small hemorrhages were often present on the exudates. The vitreous became very clouded, but there never was any evidence of a choroidal process. The veins generally showed no particular change; they were more defined against the white back-

ground and somewhat fuller than normal. As the process extended, the earlier exudates split up, grew smaller, and became absorbed, to leave distinct connective-tissue changes in the retina. On December 13th, two months after the beginning, no new exudates formed. The absorption and transformation to connective tissue progressed slowly, and on March 5th only two exudates were still visible, and these were reduced one-half in size. Along the superior temporal and nasal veins partial choroidal depigmentation had taken place. On April 21st, V. =  $\frac{18}{200}$ , with central scotoma. The ophthalmoscope showed a healed process, a clear vitreous, connective-tissue changes in the retina, and some superficial choroidal depigmentation in the distribution of the former retinal exudation.

This was unquestionably a retinal process. As the exudations formed, it could be seen that the larger patches were composed of several irregularly rounded, smaller areas. They were situated beneath the retinal vessels, often accompanied by small striated hemorrhages. As they healed, typical retinal sclerosis occurred. In some places the inflammatory process was extensive enough to cause a superficial choroidal depigmentation, but nowhere was the usual choroidal atrophy observed with pigment proliferation.

In my opinion, this case was also tuberculous, and, considering the extent and severity of the process, the outcome must be regarded as very favorable, for which the specific tuberculin treatment was probably in great part responsible.

## DISCISSION OF THE CRYSTALLINE LENS.<sup>1</sup>

BY EDWARD JACKSON, M.D., DENVER, COL.

(With one cut in text.)

IMPROVEMENT in the more common and important operations to be done on the eyeball will come through greater exactness in planning and executing each particular step of operative procedure; and with such improvement a wider field for its application. The procedures for cutting or breaking up the crystalline lens are rather loosely described in our standard works on ophthalmology, and they are often executed without attention to details which will determine their safety and the success that will be attained. Discission of the lens aims to cause disintegration of the lens substance, so that it may ultimately be removed by absorption. The change in the lens substance begins with clouding and swelling. It gradually becomes more opaque, friable, and liquid, and this is followed by absorption.

The case being a proper one for discission, the eye is prepared by full dilatation of the pupil with atropin, and local anæsthesia secured by two instillations of a 4 per cent. solution of cocain, which will help to dilate the pupil. Kuhnt (*Zeitschrift für Augenheilkunde*, xxvi., p. 430) states, with emphasis, that complete general anæsthesia is essential, and others take this ground. Perfect steadiness on the part of the patient is very desirable, and if complete general narcosis were only a matter of trifling inconvenience it would be desirable. Unfortunately, general anæsthesia may be an extremely serious matter; and in adults and in older children it is unnecessary. If the lids be separated and the eyeball steadied by the fingers

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<sup>1</sup> Read at the meeting of the American Ophthalmological Society, Washington, D. C., June, 1913.



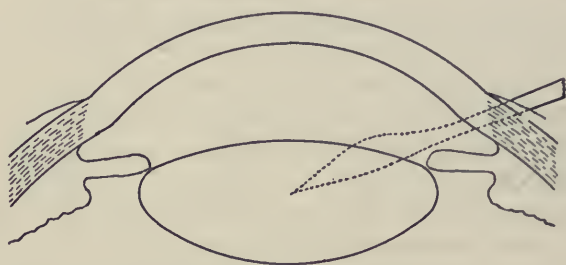
of the operator, very fair control of ocular movements is obtained, and this can be supplemented by holding firmly the needle when it has been introduced through the sclero-corneal coat. Only in very exceptional cases should one proceed to operate without the strong probability of complete steadiness of the eyeball. But the importance of this may be somewhat modified by the condition of the lens to be dealt with. I have not encountered serious difficulty or complications from movements of the globe during the operation, which has generally been done under local anæsthesia; but it is a matter in which the individual operator must have full latitude of choice, and a decision is to be reached after careful consideration of the individual case.

The first step, the introduction of the needle, is still described in the majority of text-books as to be done through the clear cornea. Fifteen years ago, when the writer urged entering the knife-needle through the vascular limbus for the discission of pupillary membranes, on account of certain mechanical disadvantages, he did not suggest avoidance of the clear cornea when doing discission of the lens. The needle introduced to break up the crystalline lens does not need to make the same free sweep as to divide a pupillary membrane. So it should not do as much damage to the corneal tissue about the point of penetration. But even for discission it is safer to introduce the needle through vascular tissue, and this plan I have followed of late years.

Among fourteen of the more complete works on diseases of the eye or on ophthalmic operations, issued within the last five years, examined with reference to this point, only five writers, Parsons, Beard, Callan (Wood's *System of Ophthalmic Operations*), Bach (Axenfeld's *Lehrbuch*), and de Schweinitz (as a preferred alternative method), clearly recommend this entering of the needle through the vascular limbus.

The puncture is commonly made through the outer or outer-lower portion of the limbus, where there will be the greatest freedom of movement and the least interference with it by the orbital margin. Starting from one-half to one millimeter back from the clear cornea, the needle should be entered almost parallel to the plane of the iris until the point has passed the edge of the pupil. Then with the back or flat of the needle

toward the iris the point may be depressed until it touches the capsule, and then pushed directly forward as near as may be to the center of the lens nucleus. After this direct forward thrust it is directly withdrawn. The position of the needle at the completion of the forward thrust is shown by the dotted lines in the accompanying figure.



This constitutes the first needling for a lens not previously opened by trauma, or completely opaque and noticeably shrunken. If any large amount of clear lens substance be present, it is important not to make the first attack any more radical. This constitutes what Kuhnt has well called a "test discission." It generally starts the process by which the lens is to be removed, and it tests the probable reaction of the eye to such operative interference. If the needle be narrow and directly withdrawn, the capsule may close in a young child, and the lens remain clear. I have seen this occur where, immediately after the needling, the path of the needle could be distinctly seen to pass through the whole thickness of the lens. On the other hand, I have seen complete absorption of the previously clear lens follow one needling in a girl of eighteen, where the needle,  $1\frac{1}{4}mm$  wide, was thrust into the center of the nucleus and then given a half-turn before withdrawal. Between these extremes any grade of effect may be produced.

It is expected that the first operation will carry the lens somewhat toward absorption, but it is well to regard it rather as a test and a preparatory procedure than to expect it to produce a definite considerable removal of the lens substance.

The procedure thus described differs from that of Kuhnt and some others in that the discission is not confined to the anterior cortex, but attempts to open a channel for the aque-

ous to the very center of the nucleus. This is not of great importance in young children, who have no nucleus perceptibly firmer than the cortex. But in older children and in adults the invasion of the nucleus is important. Where a firmer nucleus is present, it offers the obstacle which makes removal of the lens by absorption slow and difficult. So long as soft cortex remains, its absorption goes on satisfactorily. But when the cortex is gone there may remain a nuclear mass that will last indefinitely, unless it has been broken up with the needle. During the early stages of the process, while the lens capsule is still filled with the lens substance, it is not difficult to incise the nucleus and start it on the way to absorption. But after the cortex has been absorbed and the nucleus lies loose in the capsule it is very difficult to divide it or break it up with any form of knife-needle: Some firm nucleus may exist early in childhood, and on this account it is better to have the first thrust of the needle pass into the nucleus and start the process of disintegration.

The extent of mechanical disorganization of the lens to be aimed at in a second needling must depend somewhat on the effects of the first. If the first operation caused a marked swelling and general opacity of the lens, and time has been allowed for any extruded lens substance to be dissolved, and the bulging of the point of opening in the capsule to subside somewhat, a more decided effect may safely be attempted.

In the second operation it is well to aim chiefly at disintegration of the nucleus without much extension of the opening in the capsule. The point of entrance is practically the same as for the first needling; the needle is carried well into or through the nucleus, and is turned and made to cut up and down so that the nucleus may be broken up into several fragments. If the opening into the capsule is enlarged it should be in the direction of the center of the pupil. At this stage the capsule is still friable and cuts easily. Lens swelling tends to enlarge the opening and so increase the effect of the operation. The ideal procedure at this stage should aim at securing the greatest disintegration of the lens inside of the capsule. Only after such disintegration has been fairly completed is it safe to have large masses of lens substance fall into the anterior chamber.

If, on the other hand, the effect of the first needling has been comparatively slight, and yet distinctly noticeable, we are justified in assuming that the factors producing lens absorption are such, in this particular eye, that more mechanical effect must be produced by the operation than would be safe in some other eyes. If, therefore, a sufficient time (one to two months) has been allowed to elapse between operations, one may proceed in such an eye to stir up the nucleus almost as freely as he would in an eye that had made more decided progress.

After such a second operation it is commonly best to wait until very decided shrinking of the lens has occurred, and certainly until the eruption of lens matter through the opening in the capsule has entirely ceased. Subsequent needlings must be planned to meet the conditions of the particular lens. After the lens has shrunk one-half in bulk (the remaining substance probably not representing more than one-sixth to one-tenth of the original lens), one may proceed to do an operation that will fully open both anterior and posterior capsules. In young people, to get a permanently clear pupil, the anterior capsule must be removed from the pupillary area, and even the posterior capsule may prevent the best vision.

With regard to the needle to be used in such operations: Any of the straight needles will answer. For the first operation the Bowman lance-head stop-needle is quite satisfactory; the Knapp needle is equally so. I rather prefer these to the Ziegler knife-needle, because the greater breadth of the blade allows the necessary opening to be made by the simple thrust and withdrawal. The width of blade entering the lens should be 1 to 1.5mm. In the final operation the knife-needle of the Hays-Ziegler type is distinctly preferable. It has less tendency to push the membrane aside when it comes to making a division of the capsule.

In the operation of discission, safety and complete success are attained by allowing sufficient time. In young children three operations will usually be sufficient, but twice that many may sometimes be better, where the process starts very slowly. In older patients the larger number is often required. Even for young children it is best to start with the understand-



ing that it may take six months to effect the desired result. In older persons it is better to allow a year.

Clearly the method is not one to be advised for patients living at a distance, or who must be rid of the cataract at a certain definite time. But for those within easy access and able to wait it may often be the best method and one causing the least inconvenience or disturbance of ordinary occupations. After needling, the other eye should not be used for exacting work during the period of reaction. But it need not be closed, and even the eye operated on is better freed from all dressings within twenty-four hours.

The usefulness of the method is not so restricted by age, as has frequently been supposed. I have had two patients successfully treated by needling of complete cataract after the age of forty; and up to that age it is to be considered a possible therapeutic resource. Under thirty, if not excluded by lack of the time required, it is a method always to be considered.

## CLINICAL AND ANATOMICAL REPORT OF A CASE OF CONGENITAL DISTICHIASIS.<sup>1</sup>

By HOWELL L. BEGLE, M.D., DETROIT, MICH.

Abbreviated Translation by the Author from the *Arch. f. Augenh'lk.*,  
Vol. LXXIV., 1913.

(With Plates VI. and VII. of the German Edition.)

CONGENITAL distichiasis is one of the rarest anomalies of the lid met with in ophthalmic practice. Clinically it is characterized by the presence of a more or less regular row of accessory cilia, which spring from the inner border of the lid margin, where the openings of the Meibomian glands normally occur. Usually all four lids exhibit the anomaly, but frequently to an unequal extent.

On account of their location the cilia tend to brush the cornea on movements of the eyeball, but variations in the coarseness and direction of the hairs probably explain why in some cases the cornea is early affected, while in others it remains for a long time intact. The fact that the condition is usually observed at an early age in individuals with otherwise normal lids speaks for the congenital origin of the anomaly; moreover, in cases reported by Wood, Westhoff, and Erdmann, it appeared to be inherited in as much as several members of the same family were afflicted. According to Schweigger, Fuchs, Kuhnt, and other writers, a sharp distinction is to be drawn between congenital distichiasis and so-called distichiasis of inflammatory origin, the latter condition being properly a form of trichiasis. Since Kuhnt's contribution to this subject in 1899, there has been, in fact, a general tendency for ophthalmological

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<sup>1</sup> From the German University Eye Clinic in Prague. Director: Prof. Dr. A. Elschnig.

writers to limit the term distichiasis to the congenital form. That a disturbance in the development of the Meibomian glands is associated with the occurrence of the posteriorly placed cilia, is clinically apparent from the complete or partial absence of the glandular outlines beneath the conjunctiva and of the duct openings on the lid margin.

About 25 cases of congenital distichiasis are reported in medical literature, and in five of these a histological examination was made, namely, in the cases of Herrnheiser, Kuhnt, Erdmann (2), and Brailey. Herrnheiser's, Kuhnt's, and one of Erdmann's were cases of complete distichiasis in as much as an unbroken row of accessory cilia was present on each lid-margin, the cilia, in number, approximating that of the Meibomian glands in normal lids. Brailey's and one of Erdmann's were cases of partial distichiasis in that the rows of cilia were now and then interrupted by the occurrence of hair-free places. Kuhnt, examining microscopically two wedge-shaped pieces excised from an upper and a lower lid, found no trace of the Meibomian glands, these structures being replaced by the follicles of the accessory cilia. The Meibomian glands were apparently absent in the case reported by Brailey, who examined a small part of the tarsus excised from the conjunctival surface. While Herrnheiser and Erdmann found normal Meibomian glands absent in their microscopical examinations, the follicles of the accessory cilia were supplied with hyperplastic sebaceous glands, and these glands were regarded by both writers as rudimentary Meibomian glands despite the fact that they discharged into hair-follicles. They found support for this view in the arrangement of the alveoli one above the other on either side of the hair-follicle in much the same manner that the alveoli of a Meibomian gland are arranged about the common outlet duct. Kuhnt, in fact, also made note of a moderate hyperplasia of the sebaceous glands of the follicles, but he attached apparently no significance to this observation. He laid more stress on a marked hyperplasia of the modified sweat glands in his case, for he thought that the hyperplasia of these structures had resulted from an attempt on the part of nature to supply the lid margins with a sufficient fatty secretion.

In so far, then, as the findings of the above-named writers

are in agreement, it appears that the chief histological features of congenital distichiasis are the absence of Meibomian glands and their replacement by hair follicles with hyperplastic sebaceous glands. It must be borne in mind, however, that the examinations were made on small pieces only of the lid. While, therefore, in complete distichiasis these findings probably typify the anomaly in its entirety, in partial distichiasis, on account of the lack of uniformity, they may not sufficiently define the anatomical condition present. In as much as the hyperplasia of the sweat glands of the hair follicles described by Kuhnt is an isolated observation, further histological examinations are required to show whether this is an incidental or characteristic feature of the anomaly. The assumption of Herrnheiser and Erdmann that the hyperplastic sebaceous glands of the hair follicles are rudimentary Meibomian glands will be referred to later in this discussion.

To the cases of congenital distichiasis already published, I desire to add the following case which I have had the opportunity of examining clinically and histologically at the German University Eye Clinic of Prague. For the privileges thus granted me, I beg to acknowledge my indebtedness to the director of the above-mentioned clinic, Professor Elschnig. As evidence of the rarity of congenital distichiasis, I may state that during the last six years, in which period nearly fifty thousand eye patients have attended the clinic, only a single case of the anomaly has been met with.

Adele J., 30 years old, single, was accepted as a patient in the German University Eye Clinic of Prague, May 20, 1912. Two years previously she had suffered from an ulcer on the cornea of the left eye, which had arisen without apparent cause. For a year the right eye also had felt irritated. She stated that she had not had inflamed eyes when a child; in fact, that she had had no trouble with her eyes before the period mentioned. She was not aware that she had any abnormality of the eyelashes. Since childhood, according to her statement, she had suffered from epileptic attacks, and she had recently undergone an operation in the surgical clinic (Professor Schloffer) on account of disease of the left elbow-joint. There was nothing in her family history pointing to the occurrence of an abnormality of the cilia in any other member of her family.

The patient was a slender brunette, with pale skin and



slight eczema about the anterior nares. The eyelids were normal in form as well as in their position with respect to the eyeball. The anterior cilia were black in color and were normal in number, direction, and position.

By close examination a row of cilia was observed which sprang from the inner border of each lid margin where the openings of the Meibomian ducts are normally seen. The inner angle of the lid margin was slightly rounded and, as a result, the accessory cilia lay close to the eyeball and on movements of the latter rubbed the cornea with their entire lengths rather than with their points. The anomaly was more marked on the lower lids than on the upper lids. While there were thirteen and seventeen cilia on the lower lids there were only seven and eight on the upper lids. The cilia occurred at unequal intervals on the upper lids. On the lower lids they were more regular, but the cilia were occasionally separated by such wide intervals that distinct breaks in the rows seemed to occur. Most of the cilia were well-developed, black in color, and from 3 to 5mm in length. Here and there on each lid margin a number of glandular openings were observed in line with the accessory cilia. They were small and not readily seen even with a magnifying lens, but their presence was indicated by the flow of sebum-like material from them at varying intervals.

The lid margin and conjunctiva were free from scars. There was a slight chronic conjunctivitis. While the outlines of Meibomian glands were nowhere visible, there could be seen through the conjunctiva small yellowish punctiform structures which were thickly and irregularly distributed in a narrow zone lying parallel and close to the lid margin. Ten of these structures were counted in an area extending along the inner border of the lid margin  $\frac{1}{2}$ cm. They were absent in the left upper lid in a small area of 1cm extent near the inner canthus. They resembled the Meibomian glands in color alone.

There were several superficial central opacities and a few small regressive ulcers on the cornea of the left eye. The cornea of the right eye was intact. No other pathological changes were observed. The vision of the right eye was 1.0, that of the left eye 0.3.

To relieve the patient permanently from the ill-effects of the posteriorly placed cilia, both epilation by electrolysis and excision were employed. While the scattered cilia on the upper lids and a few cilia on the lower lids were destroyed by the former procedure, the more thickly placed cilia on the lower lids were removed by excision of the inner part of the lid

margin, followed by implantation of mucous membrane from the lip. The operation will be described later in detail.

For microscopical examination, the excised strips of tissue from the lower lids, which contained the upper  $\frac{1}{3}$  to  $\frac{1}{2}$  of the tarsi, were fixed in Orth's mixture (Müller-formol) and imbedded, a part in celloidin, a part in paraffin. Horizontal, frontal, and sagittal sections were cut in series.

Apart from the presence of the usual changes associated with a mild grade of chronic conjunctivitis and the unusual occurrence, in two instances, of long crypt-like invaginations of the tarsal conjunctiva which extended obliquely deep into the tarsus, the chief features of interest in the histological examination relate to the accessory hair follicles and the sebaceous glands.

The tarsus was free from scars and appeared normal in form and thickness. The follicles of the accessory cilia extended, more or less obliquely from the lid margin, varying distances into the tarsus. A few follicles were of such length or their course so oblique that the papillæ apparently lay outside the sections, probably deeper in the tarsus or in the pre-tarsal areolar tissue. The various anatomical elements forming the follicles showed no departure in structure or arrangement from those of normally placed cilia. The hair shafts, apparently normal in pigment content and size, were present in various stages of development. Occasionally both the old and the new hair were seen in the same follicle.

The follicles of the accessory cilia were supplied both with modified sweat glands and sebaceous glands. While the former were normally developed, the latter were markedly hyperplastic. Each follicle in the upper (proximal to the lid margin) two-thirds of its course was surrounded by from eight to twelve alveoli of round, pear-shaped, or irregular form. Near the lid margin the alveoli were generally smaller and were often elongated, and in this region the alveoli, instead of forming distinct buds from the follicle, often lay almost entirely within the epithelial sheath of the same.

In addition to the sebaceous glands discharging into the hair follicles, small independent sebaceous glands were encountered, opening upon the surface of the lid margin. By careful reconstruction of the sections, some ten or twelve such glands independent of hair follicles were demonstrated. Each gland, as a rule, consisted of a single round or elongated alveolus possessing a narrow duct-like opening through the

epithelium of the lid margin. Occasionally a gland was formed by a group of two or three alveoli with a short but well-formed common outlet duct of stratified epithelium. All of these glands were located close to the lid margin, rarely extending any distance into the tarsus. They were irregularly distributed and were observed not only in the neighborhood of the hair follicles, but also in locations corresponding to hair-free places of the lid margin. While some of these glands might be considered rudimentary Meibomian glands, a nearer prototype is found in the sebaceous glands which occur independently of hair follicles in certain parts of the body where a transition from skin to mucous membrane takes place, namely, the lips, glans penis, and labia minora.

The chief findings in the histological examination of this case of congenital distichiasis may be briefly summed up as follows:

*The absence of Meibomian glands and their replacement by sebaceous glands in the form of hyperplastic sebaceous glands discharging into the follicles of well-developed accessory cilia, and of small, simple, independent sebaceous glands irregularly scattered just beneath the lid margin and discharging upon its surface.*

While these findings were derived from microscopical examination of tissue from the lower lids only, it seems reasonable to suppose that the same histological conditions existed in the upper lids, in as much as the clinical pictures in both were essentially the same. Fewer hair follicles and a relatively larger number of the small independent sebaceous glands, however, might be expected to occur in the upper lids.

The results of the histological examination of this case of congenital distichiasis seem to bear out the findings of Herrnheiser, Kuhnt, and Erdmann, that the Meibomian glands are replaced by hair follicles having hyperplastic sebaceous glands. In addition, they show that another substitute for the Meibomian glands may occur and that in partial distichiasis the disturbance in the development of the Meibomian glands may be more extensive than the "distichiasis." While, clinically, the latter condition is the most prominent feature of the anomaly, histologically, the absence of Meibomian glands appears to be the underlying feature.

To the view of Herrnheiser and Erdmann, that the sebaceous



glands discharging into the hair follicles are rudimentary Meibomian glands, there would be no objection except for the fact that the alveoli open into a hair follicle instead of into a common outlet duct. For this appears to be the only essential difference between the alveoli of the two types of glands. No histological or physiological difference has yet been demonstrated. Certain writers indeed state that the alveoli of the follicles are closely grouped together and that their ducts tend to lie in a single plane at right angles to the hair follicle. That this, however, is not always the case follows from a study of reconstruction figures of these glands, such as those of Contino. I have been unable to make out any clear-cut difference between the glands in the case which I have described and the sebaceous glands of normal anterior cilia, excepting the hyperplasia of the former. I prefer, therefore, to designate these glands hyperplastic sebaceous glands of the hair follicles.

There was no hyperplasia of the modified sweat-glands in this case such as Kuhnt described. His assumption that the sweat-glands had taken over the function of the absent Meibomian glands seems improbable on account of the anatomical and physiological differences between the two glands. I am inclined to concur with Erdmann who viewed the hyperplasia of these glands as a result of long-standing irritation caused by the accessory cilia.

An explanation of the origin of congenital distichiasis has been offered both by Kuhnt and Erdmann.

Kuhnt designated congenital distichiasis a "heterotopic developmental anomaly," and stated that as a result of some unknown perverse developmental influence cilia had appeared simultaneously at the posterior and anterior angles of the lid margin, those in the former position taking the place of the Meibomian glands.

Erdmann, pointing out the known analogy in the embryological development of cilia and Meibomian glands, advanced the view that in congenital distichiasis the formation of hair and Meibomian glands takes place in the same "anlagen," the result of this disturbance being a rudimentary development of both parts.

While this explanation of Erdmann's appears plausible in his case and perhaps in Kuhnt's case as well, provided that the



hyperplastic sebaceous glands may be regarded as rudimentary Meibomian glands, it is at least insufficient to explain the case which I have described, for in as much as Meibomian glands were absent in parts of the lid corresponding to hair-free places on the lid margin, one must assume that even the "anlagen" were not laid down.

I believe that congenital distichiasis is best explained as an atavistic phenomenon in the sense that gland structures of a highly modified type having failed to develop, an attempt is here made to replace them by structures of similar character but phylogenetically of a more primitive type.

The phylogenesis of the Meibomian glands, in so far as it has been an object of investigation, furnishes support for this theory, for, according to a summary of the known facts by H. Virchow, the Meibomian glands appear to be modified sebaceous glands of hair follicles. This follows, in particular, from the investigations of Eggeling, who states that the Meibomian glands in their most primitive form (in *Igel* and *Ornithorynchus*) are still in union with a hair follicle and appear as ordinary hyperplastic sebaceous glands of hair follicles.

This observation permits the assumption that in congenital distichiasis the accessory hair follicles with their sebaceous glands, which have replaced the Meibomian glands, are not essentially different in character from the latter structures, but only in the respect of being a more primitive type. While in man the accessory cilia into which the sebaceous glands discharge exert a pernicious influence, it is possible that in lower animals they possess a function not different from that of more anteriorly placed cilia.

Further support for this theory is found in the fact that this same primitive form of Meibomian gland persists normally in the caruncle of man, for Ask has shown that, at a time when the caruncle embryologically is still a part of the lower lid, the "anlagen" of its hair follicles and sebaceous glands stand in line with the "anlagen" of the Meibomian glands.

The attempt to replace the absent Meibomian glands in congenital distichiasis by more primitive types can, it is evident, fully or only partially succeed. While in Kuhnt's, Herrnheiser's, and one of Erdmann's cases the substitution appears to

have been complete, in the case which I have described it apparently only partially succeeded. The development of small, simple sebaceous glands just under the lid margin represents, in my opinion, a further attempt, perhaps at a later embryological period, to supply a sufficient fatty secretion to the lid margin.

Three similar operations were performed by Professor Elschnig on the lower lids for the purpose of removing the accessory cilia. The first operation was made on the outer half of the left lower lid, and was carried out in detail as follows.

Under local anæsthesia (1% novocain with  $\frac{1}{10}$  volume of synthetic adrenalin), an intermarginal incision about  $1\frac{1}{2}$  cm long was made just in front of the accessory cilia. This incision, which was about  $3\frac{1}{2}$  mm deep, was intersected by a second horizontal incision through the conjunctiva an equal distance below the lid margin. Short vertical incisions at the extremities of the first incision permitted then the removal of a strip of tissue containing the accessory hair follicles. With the same anæsthetic a flap of mucous membrane, sufficiently large to cover the defect in the lid, was dissected from the lip and put in place without sutures, but held by a tightly fitting binocular bandage.

Healing occurred in about ten days and the result was so satisfactory that similar operations were then performed on the lid margin of the right lower-lid and the medial half of the left lower-lid margin. As a result of this procedure, not only were the accessory cilia removed, but the patient was left with a normal-appearing lid margin. The patient was seen six months after the operation. It was somewhat surprising that no cilia had recurred, in as much as the histological examination showed that a few hair-papillæ had been left behind. The patient stated that for several weeks after her return home she had suffered from an outbreak of styes on the lower lids.

The following summarizes the therapy of congenital distichiasis, according to the experience derived from this case.

Excision of that part of the lid bearing the accessory cilia, with implantation of mucous membrane from the lip, may be recommended as a highly satisfactory method of dealing with congenital distichiasis. When a row in which the cilia are

thickly distributed is broken by the occurrence of places where cilia are absent or scattered, these places may be excluded from the incision and the scattered cilia later destroyed by electrolysis.

Excision with transplantation of mucous membrane does not appear to have been employed in previous cases of congenital distichiasis, but a review of the literature revealed the fact that it had already been proposed by Kuhnt on theoretical grounds.

The full bibliography is given in the German original.

## ON THE PATHOGENESIS OF SCLERAL STAPHYLOMA.

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*(With two illustrations on Text-Plate XIII.)*

THE generally known view as to the origin and mode of formation of staphylomata of the eyeball is that given by Birnbacher and Czermak (1).

These authors made a most thorough study of the different types of staphylomata and found that they always originated at some point where the resistance and elasticity of the sclera are less than normal.

This diminution in resistance of the sclera may be due either to inflammation with degeneration of the tissues or to local weakening at the point of entrance of vessels and nerves. All the staphylomata which Birnbacher and Czermak examined were due to a combination of these two factors—that is, the bulging of the sclera always took place where vessels entered the eyeball and inflammatory changes could always be demonstrated at this point. Deep scleritis, malignant tumors, or tuberculous foci, for instance, may all cause local degenerative changes and weakness in the sclera.

The exact mode of formation and progression of a staphyloma is explained by Birnbacher and Czermak in the following way:

We assume that some weakened spot in the sclera begins to yield before a normal or increased ocular pressure. As the sclera possesses very little elasticity, the inner fibers cannot



DRAWING ILLUSTRATING DR. MATTICE'S ARTICLE "ON THE PATHOGENESIS OF SCLERAL STAPHYLOMA"

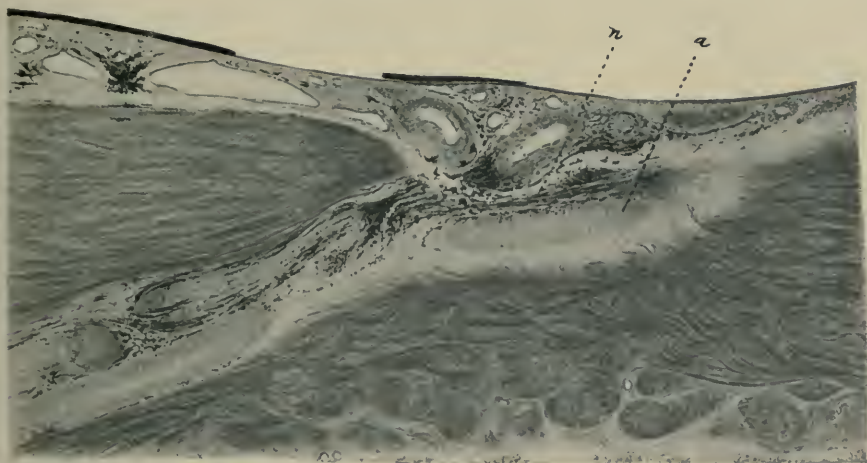


FIG. 1.

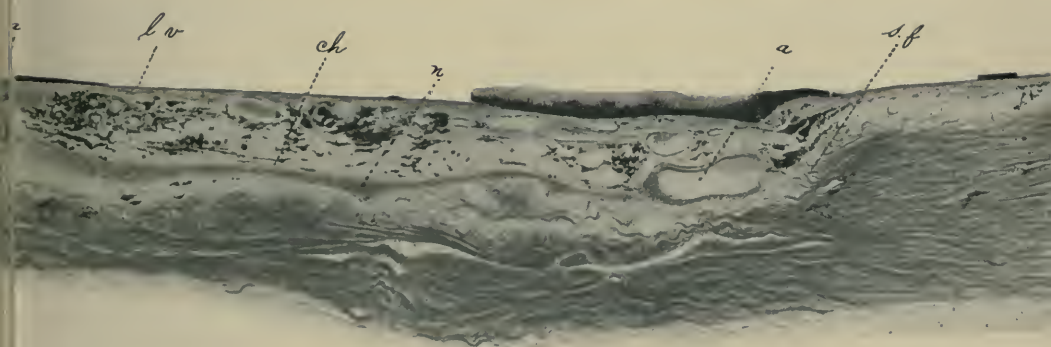


FIG. 2.

- G. 1. Normal point of entrance of long posterior ciliary artery (*a*) and nerve (*n*) on the inner surface of the sclera at a point *posterior* to the staphyloma seen in Fig. 2.
  - G. 2. Showing finer histological details of a beginning scleral staphyloma situated anterior to the point of entrance of the long posterior ciliary artery and nerve shown in Fig. 1. and posterior to the equator of the eyeball.
- Long posterior ciliary artery.
  - Long posterior ciliary nerve.
  - Lamina vitrea.
  - Normal choroid, filling out loosely the space between lamina vitrea and floor of the staphyloma.
  - No adhesions to sclera.
  - Scleral fibers showing curled-up ends broken off short at the wall of the excavation.



stretch sufficiently to preserve their integrity, and finally break off short, the broken ends retracting somewhat.

The fibers immediately below are now exposed directly to the action of the intraocular pressure and break off, exposing the next layer. In this manner successive layers are broken through; the scleral wall becomes thinner and finally yields *in toto* before the intraocular pressure, forming an ectasia. As proof of this method of formation of staphylomata, Birnbacher and Czermak cite their histological findings.

If one studies the edges of the excavation on the inner surface of a larger and older staphyloma, it will be seen that the scleral fibers have not been simply bulged out as in the wall of a rubber ball. On the contrary, when traced along the scleral wall to the excavation, the fibers are found to break off short, and their more or less contracted ends give the slanting edges of the excavation a rough appearance.

Only the deepest fibers which form the floor of the excavation are intact. These fibers may also rupture later and the process continues until the scleral wall has been almost or completely broken through.

The relation which the uvea bears to such staphylomata was found to depend upon the degree of inflammation in the sclera and uvea. In cases where very little inflammation has occurred, the uvea retains its normal position and bridges across the mouth of the excavation. In cases, however, with more extensive inflammatory changes and exudation, the uvea is found firmly attached to the sclera as a thin atrophic layer lining the walls and floor of the excavation.

If scar tissue has been formed in the uvea prior to the beginning of the staphyloma, the uvea is found ruptured, stretching, in this case, being impossible. A normal uvea, however, may also rupture if the mouth of the excavation becomes too wide. In most of their cases Birnbacher and Czermak found the choroid adherent to the walls and floor of the excavation. As a result of their studies these authors lay down two general rules which govern the formation of staphylomata:

1. Inflammatory changes can always be demonstrated in the sclera.

2. The staphyloma always develops at a point of least resistance in the sclera, viz., where it is perforated by blood-vessels.

The work of Birnbacher and Czermak, though now old, has been generally accepted. In view of this fact, the pathological findings given below are of special interest, as they deal with a beginning equatorial staphyloma in which no traces of inflammation can be found and which did not occur at a point where vessels pass through the sclera. Up to the present time, as far as I am aware, no similar case has been described.

The sections, which are horizontal, were made from the right eye of a man seventy years old, who in consequence of an ulcer of the cornea had a large central leukoma, with increased tension and enlargement of the eyeball in general.

#### PATHOLOGICAL EXAMINATION.

The central portion of the cornea, corresponding to the previously mentioned leukoma, is composed entirely of vascularized scar tissue, is considerably thicker than the peripheral portion, and somewhat ectatic. From this central scar cicatricial tissue extends towards the periphery and is especially marked under Bowman's membrane, where it can be traced to the limbus.

Descemet's membrane is present only in the marginal portions of the cicatrix. The stroma of the iris has almost entirely disappeared, and there is seen only the retinal pigment layer applied intimately to the cornea and cicatrix.

The ciliary body shows hyaline degenerative changes, as would be expected in an eye at this age, and the choroid contains a number of hyaline excrescences.

The retina has become completely atrophic as a result of the increased tension, but neither choroid nor retina show any inflammatory changes.

The optic nerve-head shows a complete glaucomatous excavation, which is partly filled with delicate newly formed connective tissue.

The length of the eyeball from the centre of the corneal cicatrix to the margin of the glaucomatous excavation is 24 *mm*.

The chief point of interest in the specimen is a beginning staphyloma of the sclera, which is visible on the temporal side of those sections passing exactly through the horizontal



meridian, and therefore shows longitudinal sections of the temporal, long posterior ciliary artery, and the accompanying ciliary nerve. The artery and nerve (see Figure 1) pass obliquely through the sclera, run forward under the choroid for a short distance, and then dip down into the excavation formed by the staphyloma. An inspection of Figure 1 shows that the point of exit of vessel and nerve on the inner surface of the sclera is perfectly normal; there are no signs of inflammation or of beginning staphyloma. The staphyloma itself lies farther forward toward the equator of the eye, and its finer histological details are well seen in Figure 2. In this drawing the ciliary artery and nerve are shown as continuous, the two having been cut at a tangent. The point of entrance of the vortex veins, anterior to the position occupied by the staphyloma, is not shown in these sections.

The lamina vitrea of the uvea bridges over the excavation smoothly from side to side, and the space between the lamina vitrea and the artery and nerve covering the floor of the excavation is filled out by the choroid, which, however, is nowhere adherent to the sclera.

Of special interest is a study of the individual scleral fibers. When traced to the slanting edges of the excavation, they do not bend downward and pass over its floor as in a simple bulging of the sclera. On the contrary, the fibers break off short and their curled and twisted ends give the walls of the excavation the typical "ragged appearance" described by Birnbacher and Czermak, well shown in Figure 2. Some of the fibers appear as if cut off by a knife, while others are dissolved into fibrillæ.

The outer wall of the staphyloma does not show the least sign of bulging and no inflammatory changes are present.

The following measurements give the thickness of the sclera in millimeters as measured at different points:

0.64—Sclera over flat portion of the ciliary body immediately anterior to a muscle insertion.

0.37—Sclera just behind this muscle insertion.

1.31—Sclera close to the optic nerve.

0.77—Floor of the staphyloma at its thinnest portion.

0.62—Floor of the staphyloma just in front and behind the thinnest portion.

## DISCUSSION OF THE FINDINGS.

The staphyloma just described differs from an ordinary staphyloma in two particulars:

(a) In all ordinary staphylomata, whether anterior or posterior, bulging of the sclera is usually seen, but in this case none can be found. The staphyloma would have been recognized during life only as a dark spot on the sclera. Of course it must be borne in mind that such a bulging may have existed during life and have subsided with the post-mortem reduction of intraocular pressure.

(b) Location of the staphyloma. This is the chief distinguishing feature of the specimen under consideration. As has already been mentioned, such staphylomata are practically always found where the entrance of blood-vessels, together with inflammatory changes, has caused a local weakening of the sclera.

In this case, however, the staphyloma has no connection whatever with the point of entrance of blood-vessels and no inflammatory changes can be demonstrated in either retina, choroid, or sclera. How then did this staphyloma originate?

Before attempting to answer this question, it will be well to refer again to the characteristics of an ordinary staphyloma. In these cases the choroid is usually found pressed tightly against the sclera and may be so atrophic that only the pigment epithelium can be detected with the microscope.

As the excavation on the inner surface of the sclera deepens, the choroid, owing to its adhesions with the sclera, shows a cupping, which becomes more marked with the development of the staphyloma. This of course can be explained by the increased intraocular tension which presses the soft choroid tightly against the weakened sclera. Adhesions are formed, and in addition the continual action of pressure upon the sclera through the choroid causes a gradual weakening and excavation of the scleral wall.

In the case here described, however, the relation of choroid to sclera is entirely different. As seen in Figure 2, the choroid is not pressed against the floor of the excavation, but fills out loosely the space between the floor and the lamina vitrea, which is seen in its normal position bridging over the mouth of the

excavation. It is very evident, therefore, that the excavation could not have been caused alone by intraocular pressure acting through the choroid upon the sclera. Some other factor must be responsible for this change.

As has already been stated, the floor of the excavation is covered by a ciliary artery and nerve, and it is probable that this relation has a direct connection with the origin of the excavation.

It is well known, for instance, that arteries which lie over bones gradually wear grooves in the bone and these grooves become deeper with age.

It has been shown by Rubino and Bojardi (2), that the normal pressure in the retinal arteries is between 80-112mm Hg. and the same may probably be assumed for the ciliary arteries. Given now a slight anatomical weakness in any portion of the scleral wall traversed by a ciliary artery, it is very probable then that the continued action of the alternating systolic and diastolic pressure of the blood stream upon such a weakened spot in the sclera might lead to rupture of the innermost fibers and finally to the formation of a groove just as in the case of bones.

If the walls of the artery presented calcareous changes, such an action would of course be accentuated. In the present case the arterial walls are normal.

Other explanations may be offered, but after a careful study of the staphyloma here described the above theory seems most plausible.

In conclusion I wish to express my sincere appreciation of the kindness shown by Professor Fuchs in furnishing me with pathological material and in assisting me with my study of the same.

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## A COMMUNICATION UPON THE WEIGHT OF INFANTS' LENSES AND THEIR SOLIDS.

By C. A. CLAPP, M.D., BALTIMORE, MD.

DURING the work upon the autolysis of the crystalline lens as published in a preliminary report in the *A. M. A. Journal*, March 18, 1911, I found the greatest need for the exact composition of the lens in the human.

Many references could be found for the work on animal lenses, especially beef lenses (Carl Th. Morner, *Zt. für Phys. Chem.*, 1894), but for human lenses the work seemed to be more or less open to criticism.

As adult normal human lenses are quite difficult to obtain in sufficient number, I determined to work upon infants' lenses, where the connection with a foundling asylum furnished a fair amount of material.

Becker found the lenses of a foetus, in which the ocular axis was 15mm, weighed 0.07gm, and at birth, with an ocular axis of 17mm, 0.10gm, while Sappey estimates the average adult lens to weigh 0.218gm. The tables of Sappey, however, are of very little value, as the lenses were removed from eyes which had been preserved—and some of them for many years.

Priestley Smith verified Becker's figures by removing eyes one hour after death, and immersing in vitreous fluid. This method is open to some criticism, however, as osmosis would probably take place to a certain degree, and besides he worked chiefly on the eyes of adults between twenty and eighty years of age.

My material was gathered from infants from two weeks to five months of age in various degrees of nutrition. They were removed in capsule from one to twenty-four hours after death,



and placed immediately in a previously weighed weighing tube and carried directly to the laboratory, where they were weighed and placed in a vacuum desiccator and dried, weighing at intervals until a constant weight was obtained, which in many cases was only after weeks of drying.

In most cases both lenses of the infant were placed in the same tube, as there would be no appreciable difference in the two lenses, and less liability of error in a greater amount.

1. White child, age one month, 12 hours since death, both lenses removed in capsule.

Weight of tube plus lenses	3.7128 gm
Weight of tube	3.5272 "
Weight of lenses	0.1856 "
Weight of tube with lenses dried to constant weight	3.5792 "
Weight of tube	3.5272 "
Weight of solids	0.0520 "
Percentage of solids, 28.55	

2. Jewish baby, age three weeks, 18 hours since death. One lens only (one lost by rupturing capsule).

Weight of tube plus lens	3.6336 gm
Weight of tube	3.5414 "
Weight of lens	0.0922 "
Weight of tube plus lens dried	3.5646 "
Weight of tube	3.5414 "
Weight of solids	0.0232 "
Percentage of solids, 25.16	

3. White child, seven months at delivery, age three weeks. Twenty-four hours since death.

Weight of tube plus lenses	3.8722 gm
Weight of tube	3.7034 "
Weight of lenses	0.1688 "
Weight of tube plus lenses dried	3.7448 "
Weight of tube	3.7034 "
Weight of solids	0.0414 "
Percentage of solids, 24.52	

4. White child, age three weeks. Deceased 12 hours.

Weight of tube plus lenses	4.1028 gm
Weight of tube	3.8882 "
<hr/>	
Weight of lenses	0.2146 "
Weight of tube plus lenses dried	3.9452 "
Weight of tube	3.8882 "
<hr/>	
Weight of solids	0.0570 "
Percentage of solids, 26.56	

5. White child, age three and one half months. Deceased 3 hours.

Weight of tube plus lenses	3.7072 gm
Weight of tube	3.5414 "
<hr/>	
Weight of lenses	0.1658 "
Weight of tube plus lenses dried	3.5888 "
Weight of tube	3.5414 "
<hr/>	
Weight of solids	0.0474 "
Percentage of solids, 28.58	

6. White child, age three weeks. Deceased 3 hours.

Weight of tube plus lenses	3.8860 gm
Weight of tube	3.7034 "
<hr/>	
Weight of lenses	0.1826 "
Weight of tube plus lenses dried	3.7540 "
Weight of tube	3.7034 "
<hr/>	
Weight of solids	0.0506 "
Percentage of solids, 27.09	

7. Three white children, age one month. Deceased 10-12 hours.

Weight of tube plus six lenses	4.3929 gm
Weight of tube	3.7914 "
<hr/>	
Weight of six lenses	0.6015 "
Weight of tube plus lenses dried	3.9544 "
Weight of tube	3.7914 "
<hr/>	
Weight of solids	0.1630 "
Percentage of solids, 27.09	

8. Three white children, age one month. Deceased 5-12 hours. Five lenses in capsule (one ruptured).

Weight of tube plus five lenses	4.0254 gm
Weight of tube	3.5434 "
Weight of five lenses	0.4820 "
Weight of tube plus lenses dried	3.6660 "
Weight of tube	3.5434 "
Weight of solids	0.1226 "
Average weight	0.0964 "
Percentage of solids, 25.43	

9. White child, age four months. Deceased 24 hours.

Weight of tube plus lenses	4.0082 gm
Weight of tube	3.7870 "
Weight of lenses	0.2212 "
Weight of tube plus lenses dried	3.8624 "
Weight of tube	3.7870 "
Weight of solids	0.0754 "
Percentage of solids, 34.22	

10. White child, age six weeks. Time after death not stated.

Weight of tube plus lenses	3.7648 gm
Weight of tube	3.5720 "
Weight of lenses	0.1928 "
Weight of tube plus lenses dried	3.6270 "
Weight of tube	3.5710 "
Weight of solids	0.0560 "
Percentage of solids, 28.00	

11. White child, age one week. Breast feed weight,  $7\frac{3}{4}$  lbs.

Weight of tube plus lenses	4.0750 gm
Weight of tube	3.8902 "
Weight of lenses	0.1848 "
Weight of tube plus lenses dried	3.9398 "
Weight of tube	3.8902 "
Weight of solids	0.0496 "
Percentage of solids, 29.00	

12. White child, age five months. Weight,  $8\frac{3}{4}$  lbs. Emaciated.

Weight of tube plus lenses	4.1304 gm
Weight of tube	3.8892 "
<hr/>	
Weight of lenses	0.2412 "
Weight of tube plus lenses dried	3.9595 "
Weight of tube	3.8892 "
<hr/>	
Weight of solids	0.0703 "
Percentage of solids, 29.10	

13. White child, age three weeks. Weight,  $6\frac{3}{4}$  lbs.

Weight of tube plus lenses	3.9736 gm
Weight of tube	3.7916 "
<hr/>	
Weight of lenses	0.1820 "
Weight of tube plus lenses dried	3.8398 "
Weight of tube	3.7916 "
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Weight of solids	0.0482 "
Percentage of solids, 26.43	

14. White child, age three weeks. Weight,  $5\frac{1}{4}$  lbs.

Weight of tube plus lenses	3.7330 gm
Weight of tube	3.5430 "
<hr/>	
Weight of lenses	0.1900 "
Weight of tube plus lenses dried	3.5933 "
Weight of tube	3.5430 "
<hr/>	
Weight of solids	0.0503 "
Percentage of solids, 26.47	

15. White child, age 16 days. Weight,  $5\frac{3}{4}$  lbs.

Weight of tube plus lenses	3.7672 gm
Weight of tube	3.6060 "
<hr/>	
Weight of lenses	0.1612 "
Weight of tube plus lenses dried	3.6505 "
Weight of tube	3.6060 "
<hr/>	
Weight of solids	0.0445 "
Percentage of solids, 27.60	



16. White child, age 40 days; weight,  $5\frac{1}{4}$  lbs. Emaciated.

Weight of tube plus lenses	3.9058 gm
Weight of tube	3.7046 "
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Weight of lenses	0.2012 "
Weight of tube plus lenses dried	3.7597 "
Weight of tube	3.7046 "
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Weight of solids	0.0551 "
Percentage of solids, 27.33	

If these figures be arranged in relation to the age of the eyes, then there is seen a progressive increase in both weight and percentage of solids.

Age	Wt. of Lens	Wt. of Solids	% of Solids
7 days	0.0924 gm	0.0248 gm	29.00
16 "	0.0806 "	0.0222 "	27.60
21 "	0.0922 "	0.0232 "	25.16
21 "	0.0844 "	0.0207 "	24.52
21 "	0.1073 "	0.0285 "	26.56
21 "	0.0913 "	0.0253 "	27.09
21 "	0.0910 "	0.0241 "	26.43
21 "	0.0950 "	0.0256 "	26.47
30 "	0.0828 "	0.0260 "	28.55
30 "	0.1002 "	0.0271 "	27.09
30 "	0.0964 "	0.0245 "	25.43
40 "	0.1006 "	0.0275 "	27.33
42 "	0.0964 "	0.0275 "	28.00
105 "	0.0829 "	0.0237 "	28.58
120 "	0.1106 "	0.0378 "	34.22
150 "	0.1206 "	0.0352 "	29.10
<hr/>			
Average			
43 days	0.0953 gm	0.0265 gm	27.57

While the average age was six weeks, the actual age of the greater number was from three to four weeks.

The average weight was 0.0953 gm, which is somewhat less than that found by Becker (0.1000 gm at birth). Upon studying the figures one will see a gradual increase in the weight from birth until the fifth month. This shows a quite decided individual variation and seems to vary only slightly as regards the condition of nutrition of the case.

The average weight of the solids was 0.0265 gm. This also shows an increase with age, but proportionally greater, as there is seen a quite decided increase in the percentage of solids with age, the average being 27.57.

If these lenses were dried in an oven at 105° C., as is usually done in determining the solids, the percentage would undoubtedly be somewhat lower, but it would be self-evident that the proteins would be altered by such a procedure, as they are precipitated at 50°, 63°, and 72° C., and thus rendered unfit for determining the amount of insoluble albuminoid.

Priestley Smith and J. Treacher Collins place the percentage of solids at 29 in adults. I can find no figures for infants. This study would therefore seem to prove that the weight of infant lenses is subject to comparatively wide variation, but upon the whole to be somewhat less than that usually given, and that the percentage of solids is less than that for an adult, being on an average 27.57.

REPORT OF THE PROCEEDINGS OF THE SECTION  
ON OPHTHALMOLOGY OF THE BRITISH  
MEDICAL ASSOCIATION.

BY MR. C. DEVEREUX MARSHALL, F.R.C.S., LONDON.

MEETING OF WEDNESDAY, JULY 23, 1913. MR. T. H. BICKERTON, PRESIDENT,  
IN THE CHAIR.

The PRESIDENT opened the work of the Section with an address in which he sketched the progress of ophthalmology during the last century, and paid special attention to the part taken by the British Medical Association in its development.

Mr. JOHN HERN (Darlington) opened a discussion on School Clinics in relation to the **prevention of myopia**. He considered them under four conditions which acted as causes for its production: (a) inherited tendency; (b) using the eyes for near vision; (c) congestion of the coats of the eyeball (especially the sclerotic) produced by stooping; (d) compression of the eyeballs on looking downwards by the extrinsic muscles, especially the obliques. The practical point was, How could it be prevented? The most important thing was an accurate correction of the refractive error, so that all strain might be removed, and the eye allowed to develop in the right directions. Good illumination, and a correct position of the child's books were essential. Distant vision should be encouraged. He claimed by these means not only to have prevented the development, but also to have seen well marked cases of myopia become emmetropic.

Mr. MADDUX (Bournemouth) said he was in general agreement with Mr. Hern, but he had never seen myopia change into emmetropia. He viewed with approval the formation of special schools for myopic children, though it was difficult

to persuade parents to send their children to any school of the kind. He suggested that this disinclination of the parents might be overcome by the formation of special classes in the ordinary schools.

Mr. T. HARRISON BUTLER (Leamington) thought that the mechanical theories of the production of myopia by such means as Mr. Hearn suggested, had not been fully proved. There was much experimental evidence against it. The clinical evidence that advanced myopia was found in children under the school age, and the not infrequent occurrence of unilateral myopia, told strongly against these views. He pointed out that efforts at prophylaxis extending over a quarter of a century had had no effect in reducing the incidence of myopia in Germany. He thought that the disease was due to an inherent vice in the sclera, which allowed the posterior pole to stretch under the normal intraocular tension. Any debilitating influence, such as high pressure in school, would aggravate this tendency. The introduction of open-air games in the Swedish schools had greatly reduced the incidence of myopia. High grade myopia with choroidal changes had been shown by recent German statistics to be more common among the rural population than among the more educated.

Dr. J. A. WILSON (Glasgow) said that there was no evidence that myopia was directly due to school work. He pointed out that the changes in myopia were quite different from those seen in buphthalmos and other conditions in which the intraocular tension was definitely raised, and also that myopia definitely existed in people who had never done any near work. He considered that heredity was the principal factor, and high myopia was an evidence of a general diseased condition of the eye, and that there was not much evidence to show that school work *per se* was a cause of myopia. He approved of general hygienic school measures.

Mr. BISHOP HARMAN (London) was surprised that, while German work had been largely drawn upon, the excellent work of the Medical Officers of the Education Committee of the London County Council seemed to be almost unknown to the majority of speakers. Their statistics showed that myopia in London school children was an almost negligible quantity, amounting to less than 1%.



Dr. JOHN E. WEEKS (New York) said that myopia developed much more frequently in young individuals who did much near work. He thought the ultimate cause was an undue distensibility of the sclera, which was aggravated by bad hygienic conditions and close work. In his private practice he found that carefully corrected myopia seldom advanced beyond a very moderate degree when due attention was given to correct hygiene.

Dr. R. A. REEVE (Toronto) thought that the cases of cured myopia alluded to by the opener of the discussion were really due to prolonged spasm of accommodation. He himself had never witnessed a case of true myopia being cured. Cases of this variety were often treated by prescribing opticians with *minus* glasses, with disastrous results to the well-being of the patients. In America the results of careful prophylactic treatment were much more favorable than those mentioned by Dr. Butler in Germany. In this connection, he brought forward the published statistics of Dr. Risley, of Philadelphia.

Mr. HERBERT PARSONS laid stress on the varieties of myopia. Those due to normal variations were often stationary. He did not think that congestion of the head was a factor capable of physiological proof, but his own experiments on animals convinced him that spasm of the extraocular muscles could raise the tension to a marked degree. In progressive myopia, some weakness of the sclera must be hypothecated, but every effort should be used to guard against the ill effects of near work.

Dr. MARION GILCHRIST (Glasgow) agreed that heredity had much to do with the development of myopia, but she had never seen a case cured. Bad hygienic conditions, excessive near work, and faulty correction of the refraction, all caused it to develop.

Colonel PRIDMORE (Rangoon) said that among the natives, boys suffered far more from myopia than girls, and this was due to the much more studious habits of the boys.

The PRESIDENT shortly summed up.

Mr. A. FERGUSON MACCALLAN (Egypt) read a paper on the **ophthalmic schools clinics** of Egypt. The measures adopted included the active surgical repression of trachoma,

the correction of errors of refraction with the gratuitous provision of spectacles, the isolation and treatment of acute conjunctivitis, and the preparation of detailed statistics. As most children were infected before school life, about 96% were found to be still suffering from the disease. Those which had been cured in 1907 amounted to 2%, and in 1913 to 55%. He gave detailed statistics about the cases, and explained the tables he showed.

Colonel ELLIOT (Madras) thought that Mr. MacCallan's classification of cases of trachoma was most valuable. In India the disease was largely spread by the use of antimony paste, a cosmetic widely used by the more well-to-do classes.

Mr. E. E. MADDOX (Bournemouth) read a paper on **super-corneal sutures**, and an operation for conical cornea. By supercorneal suture he meant threads designedly laid over the face of the cornea, either nakedly or with the intervention of oiled membrane, for the purpose of effecting direct traction on the conjunctiva. The toleration of the cornea to such sutures was remarkable, and they were of value after certain traumatisms, and after the operation for conical cornea by excision of the ellipse.

Remarks were made by Messrs. DEVEREUX MARSHALL, HEARN, and W. H. BRAILEY.

Dr. J. A. WILSON (Glasgow) read a paper on **nystagmus**, with a review of 100 cases, chiefly ordinary, or non-miner's, nystagmus. He pointed out that in non-miner's cases there was usually some other ocular defect. In miner's nystagmus, also, there was also imperfection of retinal images, and in this way they resembled each other. He suggested the ametropic or other defect was equivalent to the darkness of a mine as a causative agent.

MEETING OF THURSDAY, JULY 24, 1913. MR. T. H. BICKERTON,  
PRESIDENT, IN THE CHAIR.

Dr. F. W. EDRIDGE-GREEN read a paper on the **history of the sight tests of the Board of Trade**. He pointed out that the first Commission which was appointed to consider the matter deliberately refused to examine his color-blind patients who were able to pass the Holmgren test with ease, and ultimately recommended this test as the sole means of

examining the candidate. The inefficiency of this test became so notorious that, after several questions had been asked in Parliament, a new Commission was appointed two or three years ago. This Commission consisted almost entirely of known advocates of the test, and not one person was included who had taken part in exposing its inadequacy. Under these circumstances, the Imperial Merchant Service Guild refused to give evidence before the Committee likely to be so biased in favor of tests which had caused so much hardship to many of their members who had passed the tests on taking their first examinations, and then, many years later, had been rejected and deprived of their means of earning their livelihood. This Commission, like the former one, had refused to allow him to demonstrate cases before them. The report they issued again recommended a modified wool test, to which they added a lantern which the author considered quite inadequate, containing, as it did, only three colors, without the addition of any modifying neutral glasses. It was obvious, after a careful perusal of the report, that the Commission still believed the wool test to be an efficient one, and only adopted the lantern tentatively. During the first six months the lantern was used, the rejections had risen from 0.8% to 6.22%, and the whole of this increase was due to the lantern. Although a large number passed the wools and failed with the lantern, not one was found who passed the lantern and failed with the wools. Dr. Edridge-Green therefore concluded that even this very inefficient lantern had more than justified its existence. He also criticised the form test, which was carried out with letters printed on a scroll which unrolled unevenly, thus materially altering the size of the letters. He also adversely criticised the slipshod method of illumination, and the fact that the examination was conducted by laymen who had no technical knowledge of the eye or of color vision. He therefore proposed the following resolution: "That the sight tests of the Board of Trade are not satisfactory, and that an enquiry is urgently needed in the interests of the Mercantile Marine of the nation."

Mr. DEVEREUX MARSHALL seconded this. He was in complete agreement with all that Dr. Edridge-Green had said. He considered the new lantern inefficient in every important



particular, and was so simple that any candidate could have one made and thus make himself acquainted with the only two colors which it exhibited. The methods used were so unscientific and were employed with so little skill that probably many of those now rejected were fully competent to discharge their duties, though some of them might be weak in some unimportant details.

Mr. T. HARRISON BUTLER (Leamington) pointed out that Professor Sturgardt, of Kiel, in a long paper devoted to color tests in the German Navy and railway service, although upholding the Young-Helmholtz theory, stated that Holmgren's wools should be entirely discarded. He preferred to rely on Stilling's test and Nagel's Anomaloscope. He thought it absurd that men who were stated to be too illiterate to name colors, should be expected to understand the nature of a Rayleigh equation. He adduced three cases which had recently come under his notice of railway employees who had for many years passed the companies' tests with ease, and were then rejected, and of another who passed the wools with facility and yet failed utterly with the lantern.

The PRESIDENT pointed out that Dr. Edridge-Green was not alone in the treatment he had received at the hands of the Board of Trade. He himself had had ample opportunities in Liverpool of becoming acquainted with the erratic results of the Board of Trade. He knew of several officers who had held high positions whom he found to be dangerously color-blind, although they had passed these tests. He had grown tired of making representations to the Board of Trade, and considered that the only way of influencing them was through the individual efforts of Members of Parliament. He had been long aware of the futility of the Holmgren test.

Mr. J. HERBERT PARSONS stated that as a member of the Departmental Committee his hands were to a great extent tied, but he strongly defended the lantern which the Board had adopted. Great pains had been taken to adjust the luminosity of the three colors, and it was impossible for the candidate to guess the colors by difference of luminosity alone. He believed it to be thoroughly efficient for the purpose for which it was constructed. It had been in use for too short a time for any final verdict to be given as to its value.



The Committee recognized the imperfections of the Holmgren test, but considered it advisable to retain it.

After some remarks by Mr. W. H. BRAILEY, the resolution was put, and was passed with one dissentient.

Mr. T. HARRISON BUTLER (Leamington) introduced a discussion on the **treatment of chronic dacryo-cystitis**. He pointed out that as early as the 18th century Percival Pott had recognized the futility of probing the nasal duct, and had obtained more success by lavage with Anel's syringe. He had even attempted to form an artificial opening through the lachrymal bone, thus anticipating Toti's operation. He considered the subject under the headings of the disease in children and in adults. The causes in children were failure of the nasal duct to completely canalise, a condition best met by the single passing of a probe, followed by lavage. Other causes were syphilis and tuberculosis. The causes in adults were endo-nasal disease and tuberculosis, the presence of a diverticulum from the sac, and trachoma. In non-suppurative cases, patient lavage was often a satisfactory means of treatment. When suppuration was present, lavage was rarely successful, and it was generally necessary to extirpate the sac. This should not be delayed in the case of workmen in those trades in which injuries of the cornea were frequent. Trachomatous sacs should be extirpated at once. They were very friable, and lavage often led to rupture of the sac, which had been followed by serious orbital cellulitis. He deprecated the use of probes and styles, believing that although these methods were apparently sometimes successful, the septic sac remained behind, which not infrequently led to hypopyon ulcer. The obvious endo-nasal disease should be treated, but he thought that the chronic ethmoiditis which Kuhnt and Brunzlow had shown to be the most common cause, was best left alone. He shortly described Toti's operation, which he thought to be exceedingly difficult, and only appropriate to certain cases.

Colonel ELLIOT, I.M.S. (Madras), said that the peculiar local conditions present in India made any lengthy treatment impossible. This, and the special nature of the disease met there, in which trachoma played an important part, made extirpation necessary in the vast majority of the cases. He

described his operation, emphasizing the importance of never losing touch of the anterior lachrymal crest. He considered the operation an easy one, and his results, embracing nearly 1000 cases, gave him every reason to be satisfied with the procedure.

Mr. CHARLES HIGGINS (London) had performed Toti's operation twice. He was satisfied that it marked an improvement in the treatment of the disease. He thought the operation a very difficult one to perform satisfactorily.

Dr. McREYNOLDS (Texas) said that extirpation of the sac was gaining favor in America, but he himself had seen good results from probes, even from Theobald's, of the largest size.

Mr. H. S. BROWNING (London) thought that vaccines were exceedingly useful in these cases, especially when a phlegmonous condition existed. They were, however, useless when pneumococcus was the infecting agent.

Dr. ELLETT (Memphis) advocated the use of probes.

Dr. WEEKS (New York) pointed out the difference between hospital and private patients. The latter were loath to submit to an operation until every other means had been tried. After this, he advocated excision of the sac. Epiphora was not uncommon after the operation, and he had been obliged, in some cases, to excise the lachrymal gland.

Mr. WHITING (London) thought that the operation presented great difficulties at times, and was often incompletely done, necessitating a second intervention.

Mr. BISHOP HARMAN (London) advocated not only the excision of the sac, but also the extirpation of the canaliculi.

Mr. DEVEREUX MARSHALL (London) considered that streptothrix in the canaliculus was not uncommonly met with, but was often overlooked. Still, many cases were quite obvious clinically. The treatment was simple, and it was not necessary to slit the canaliculus.

Mr. CHARLES WRAY (Croydon) preferred local anæsthesia and strongly deprecated the use of adrenalin in a patient under chloroform, as he had seen a fatal case under those conditions. The lachrymal crest was difficult to feel, but a speculum was never necessary. He thought that no sac should be lightly removed.

The PRESIDENT strongly condemned the operation of ex-

cision of the sac, as the use of hollow gold styles cured all the cases. He thought if anything were extirpated, it should be the lachrymal gland.

Mr. INGLIS POLLOCK (Glasgow) gave a lantern demonstration and read a paper on **persistence of the nerve plexus of the iris** after the excision of the ciliary ganglion and of the superior cervical sympathetic ganglion.

MEETING OF FRIDAY, JULY 25, 1913. MR. T. H. BICKERTON, PRESIDENT,  
IN THE CHAIR.

The discussion on the question of **excision of the eyeball** in cases of injury was opened by Mr. M. L. HEPBURN. He divided injuries into three groups: (1) those cases in which there was no penetration; (2) penetrating injuries with or without the presence of a foreign body; (3) blows causing (*a*) complete rupture, (*b*) sub-conjunctival rupture. The question had to be considered under the following heads: (1) immediate excision within a day or two of the injury. (2) Postponement of the excision, and the line of treatment adopted in the interval. (3) Indications for excision after temporizing for a certain period. (4) Excision when sympathetic ophthalmitis had already occurred. Unless the eye were hopelessly lost, there was no need to excise immediately. Provided antiseptic precautions were taken, he did not consider it made much difference which part of the eye was wounded. Should the eye be suppurating, evisceration was the better treatment. Little could be done with internal non-perforating injuries. In hypopyon ulcers, vigorous cauterization was necessary. Carbolic acid, except in the mild cases, was not sufficient. Should the ulcer spread and the tension become raised, the anterior chamber should be opened; but in order to prevent total anterior synechia, he preferred to do an iridectomy as soon as possible. Penetrating wounds, with or without the presence of foreign bodies, were liable to produce sympathetic ophthalmitis, yet there was scarcely any need for immediate excision in these cases. All cases should be placed before the Haab magnet, no matter what the X-ray photograph showed, and, if possible, the foreign body should be got into the anterior chamber. The iris should be freely excised should it be involved, and the lens matter removed if



it be wounded. Should the eye be infected, it did not militate against the operation. He did not consider that the presence of a foreign body was of much importance in the development of sympathetic ophthalmitis. Most cases of subconjunctival rupture led to excision. If an eye had not quieted down within six or eight weeks, the question of sympathetic trouble became a very urgent matter. Should the eye be hopelessly damaged, it should be excised. If some useful vision remained, the question was far more difficult to decide. If sympathetic trouble had developed, the original injured eye might, in the end, be the only one which retained any vision at all. The points on which he chiefly relied as danger signs were: (1) continual injection; (2) sympathetic irritation; (3) a greenish, semitranslucent look about the iris; (4) a whitish reflex from the fundus; (5) a continual fluffy appearance of the lens capsule; (6) lowered tension. Should any of these signs be present, the eye ought to be excised, then sympathetic would probably not develop. He was rather sceptical about sympathetic occurring years after the original injury.

Mr. R. AFFLECK GREEVES discussed the matter from the pathological aspect. All cases of pan-ophthalmitis ended in phthisis bulbi, and the preservation of the eye served no useful purpose. Unfortunately, sympathetic could not be diagnosed for certain until it appeared, and the causative agent and the method of its development were still matters of conjecture. Histologically, the kind of inflammation in the two eyes conformed to a definite type, and was different from other forms of uveitis. Caseation never took place, but the final result was cicatrization. Optic neuritis was inconstant, but the ciliary body and choroid were always involved. Of all the cases which occurred at Moorfields Hospital during the last fifteen years, evidence of the disease showed itself either before or within a week of the enucleation. The interval of its development after the original injury was never less than two weeks, and in the majority of cases not more than two months, although twenty years was the time in one case. Slight injuries to a damaged eye might be the starting-point of the disease. In none of these cases could penetration be excluded, and in most, ciliary body or iris was involved. Retained foreign bodies, *per se*, did not appear to greatly



favor the development of the disease. The nature of the foreign body was very important. If iron or steel, siderosis occurred, the eye eventually became lost. Suppurating eyes were not liable to produce sympathetic, neither were cases of perforating ulcers as a rule. With a globe in which bone had developed, sympathetic irritation was rather liable to occur. In all cases in which sympathetic ophthalmitis had occurred years after an injury, a recrudescence of the inflammation was the rule. The presence of keratitis punctata was most significant.

Mr. S. H. BROWNING (London) discussed the matter from the bacteriological standpoint. The important thing in the blood count was the increase in the large mononuclear leucocytes, while the polymorphs were diminished. The charts clearly suggested that sympathetic inflammation was a protozoal disease. For this reason, salvarsan had been tried, and the results obtained with it were most encouraging, both because the eye became improved, and also because the blood count rapidly approached the normal. Marked cases of sympathetic almost invariably gave a typical protozoal count. These changes had also been seen in the cases in which sympathetic had not yet developed. It was probable that in sympathetic ophthalmitis a systemic infection had already occurred before pathogenic eye changes appeared. He gave tables showing the changes which occurred in the blood in different diseases. He suggested that a differential blood count should be made in all cases of penetrating injuries; in positive cases the eyes should be excised, or else salvarsan should be given.

Mr. N. BISHOP HARMAN (London) spoke of the disease as occurring in children.

Lt. Col. ELLIOT, I.M.S. (Madras), said that in all penetrating injuries, conjunctival antiseptics was most important, together with atropine. The least possible surgical interference was desirable. A good eye should never be hazarded in vain endeavors to keep an injured one. He believed in the possibility of an old damaged eye producing sympathetic, but some eyes with retained foreign bodies continued to have good vision for a very long time. Enucleation of the eye was the operation of choice, but evisceration had often to be done in the case of Orientals who would not submit to excision. He

strongly spoke of the danger of excising suppurating eyes. Optico-ciliary neurectomy was sometimes a possible substitute for excision. He had never seen sympathetic follow Mules's operation, but he had given it up on account of the liability of the globe to come out.

Mr. HARRISON BUTLER (Leamington) doubted whether Fuchs's inflammation was typical of sympathetic. Deutchmann denied it. Copper in the eye was never tolerated.

Mr. DEVEREUX MARSHALL (London) had not the slightest fear in excising a suppurating eye; he excised every suppurating eye he came across. He had known cases in which death from meningitis had occurred after excision, and he had also known it to occur when the suppurating eye was not excised. In both instances he looked upon it as being the result of the excision having been delayed too long, and he failed to see how an eye full of pus being left in the orbit could be considered to act as a prophylactic against septic meningitis.

Mr. H. H. TAYLOR (Hove) thought it dangerous to excise suppurating eyes.

Mr. CHARLES WRAY (Croydon) said that no mention had been made of dionine in the treatment of wounds likely to lead to sympathetic. It caused intense pain when it was used. He preferred evisceration to excision in suppurating eyes. An attempt should be made to get rid of toxins by means of a considerable amount of exercise taken in the open air, together with free potations of water and the administration of mercury.

Lt. Col. W. G. PRIDMORE, I.M.S. (Rangoon), agreed that no risk should ever be run with children, and a dangerous eye should always be excised. In adults, more conservative methods might be justifiable. He was surprised to hear that Colonel Elliot had given up excision in suppurating eyes. He had excised hundreds of them, and he thought it was the best treatment in such cases.

Mr. MAURICE H. WHITING (London) described a case of perforating injury with excision on the thirteenth day. Phobophobia occurred ten days later, with a raised mononuclear blood count. After neo-salvarsan was given, there was no recurrence of the sympathetic symptoms. He preferred evisceration followed by excision of the sclera in cases of supuration.

The PRESIDENT summed up and Mr. GREEVES replied to several questions which had been asked.

Mr. A. F. MACCALLAN (Cairo) described an operation for **ectropion of the lower lid in trachoma**, which consisted of the removal of the tarsus and the formation of a fornix.

Mr. T. HARRISON BUTLER (Leamington) described **Holth's punch operation for glaucoma**. Since iridectomy did not give universally good results, sclerotomies and sclerectomies had been tried. If the wounds healed up too well, little or no good resulted. He considered that the scleral incision should be small, and a piece of it removed if drainage was to be continued. After various trials, he preferred a puncturing operation to trephining, for he thought it the safer of the two. He described various objections to the scleral trephine. He had invented a modified punch which gave, in his hands, excellent results. He now recommended a very broad Taylor's bent needle for making the incision, and then punched out a piece of the sclerotic. He considered the operation easier and more rapidly performed than trephining.

Lt. Col. ELLIOT (Madras) said that in the main he and Mr. Harrison Butler were in agreement. He considered that the introduction of a sharp-pointed instrument like a bent broad needle into the anterior chamber was a dangerous procedure, and was really unnecessary. He did not approve of performing sclerectomy on an opened eyeball with an empty anterior chamber, while in trephining the conditions were exactly the reverse. He thought that Mr. Butler's instruments must inflict damage on the surrounding tissues, while trephining produced the absolute minimum amount of surgical violence.

Dr. MCRAYNOLDS (Texas) said that the whole world was indebted to Colonel Elliot for his work on glaucoma. The success obtained with the trephine abundantly demonstrated its utility. Should the trephine not be available, he had found it possible to insert a needle and thread into the piece of sclerotic he intended to remove, then to excise it with a Beer's knife and a pair of scissors. He had done the operation with perfect success in both acute and chronic glaucoma. Remarks were made also by Mr. HEPBURN, and the PRESIDENT summed up.

## QUARTERLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY

By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMEL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic, with the Assistance of ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mainz; DANIS, Brussels; GILBERT, Munich; GRÖNHOLM, Helsingfors; v. POPPEN, St. Petersburg; TREUTLER, Dresden; and VISSER, Amsterdam.

FOURTH QUARTER, 1912—(Concluded).

Edited by Dr. MATTHIAS LANCKTON FOSTER, New Rochelle.

### XVI.—LENS.

513. BONNEFON. **Contusion cataract.** *Arch. d'ophtalm.*, xxxii., p. 748.
514. CLAIBORNE, J. H. A piece of glass in the crystalline lens with description of the eye three years and a half after the accident. *Trans. Amer. Ophthalm. Society*, 1912.
515. FRIDENBERG, PERCY. **Preparatory capsulotomy in extraction of immature senile cataract.** *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.
516. FUCHS. **The lining of the anterior chamber with epithelium after the operation for cataract.** *Ophthalmic Society of Vienna*, May 20, 1912.
517. JACKSON, EDWARD. **Management of the capsule in cataract extraction and afterward.** *Trans. Amer. Ophthalm. Society*, 1912.
518. LAMBERT, W. E. **Removal of the lens in high myopia.** *Jour. Amer. Med. Association*, Sept. 21, 1912.
519. VAN LINT, A. **The sliding flap operation in the removal of cataract.** *Ophthalmoscope*, Dec., 1912.
520. PARSONS, J. HERBERT. **The treatment of unilateral cataract.** *Lancet*, Nov. 9th.
521. VELHAGEN. **Connective-tissue formation on the posterior surface of the lens simulating a glioma retinae.** *Klin. Monatsbl. f. Augenheilk.*, Nov., 1912, p. 580.

By the term "unilateral cataract" is meant cases of cataract in which one eye only is affected; the other eye, if not normal,



having at least fair vision. The cases are divided by PARSONS (520, **Treatment of unilateral cataract**) into two groups according to age, for, generally speaking, operation is indicated in the young and not in the old. Restoration of the field of vision is to be considered one of the main advantages resulting from operation, while improvement of the central vision is secondary. By operating on the young the development of a squint is prevented, as is also the necessity of removal of a hypermature cataract at some later date. Needling should be the operation of choice. Senile cataracts should not be operated on unless the restoration of the field of vision is of prime importance or there are beginnings signs of hypermaturity. Interference is rarely justified in cases of complicated cataract, and the finding of precipitates on the posterior surface of the cornea is an absolute contra-indication.

GROUT.

FRIDENBERG (515, **Preparatory capsulotomy in extraction of immature senile cataract**) relates the history of puncture of the capsule preparatory to extraction for the purpose of ripening the cataract and making the operation more simple. His experience and observations confirm him in the opinion that the procedure is likely to grow in favor. He suggests that the advantages of tearing out a portion of the anterior capsule with forceps (anterior capsulotomy) may be combined with the preparatory capsulotomy by making the incision with the knife needle above and below and to the nasal and temporal sides, thus making it easy to remove the central portion with the forceps at the time of the extraction.

ALLING.

After he has completed the corneal section and iridectomy, JACKSON (517, **Management of the capsule in cataract extraction and afterward**) introduces the knife again into the wound in the position it occupied immediately after the counter puncture. It is then drawn out until the point is at the edge of the pupil nearest where the puncture was made, and the capsule is opened by pushing the knife forward until it passes under the iris. He believes that the method (which is like the peripheral capsulotomy of Herman Knapp) leaves a clearer pupil and less reaction than others. Statistics of fifty cases which he was able to follow for a considerable period

bear out this contention. Regarding capsulotomy after extraction he advocates a long, curved needle entered at the limbus, and makes two incisions, meeting each other at an angle. He has never seen untoward results.

ALLING.

IN VAN LINT'S (519, **The sliding flap operation in the removal of cataract**) operation the conjunctiva is freed from its attachment to the upper half of the cornea and dissected back for a distance of 1 cm. Two sutures are then passed vertically through its edge and brought out below, so that when they are tied the conjunctiva is drawn over the corneal wound, covering the upper half of the cornea. Simple extraction is performed and the wound is closed.

GROUT.

FUCHS (516, **The lining of the anterior chamber with epithelium after the operation for cataract**) says that if during the section, or in the next few days, epithelium reaches the posterior surface of the wound, it cannot be forced out by the connective tissue filling the latter, but increases so as to form a large, solid mass of epithelium, or proliferates over the inner surface so as to line the anterior chamber. If the anterior chamber should be divided into two parts by a membrane of iris, anterior capsule, or fibrin, only the one adjacent to the wound will be lined with epithelium. As a rule, the epithelium is corneal rather than conjunctival. Fuchs showed a case in which goblet cells and tubular glands were present in the anterior chamber. The aqueous suffices for nourishment, as the epithelium proliferates on the lens capsule and a clot of fibrin. The connection with the external epithelium is usually divided by the connective tissue that fills the wound. A lining of the anterior chamber with epithelium does not induce an irido-cyclitis, but a secondary glaucoma, because the sinus when thus lined is incapable of filtration. As this epithelium cannot be removed, such an eye is always lost. The diagnosis of a complete lining of the anterior chamber with epithelium cannot be made during life. Prophylaxis consists of the formation of a sufficiently large conjunctival flap at the time of operation.

TERTSCH.

VELHAGEN (521, **Connective-tissue formation on the posterior surface of the lens simulating a glioma retinæ**) reports a case of this nature, the ninth on record. The child, 7 weeks

old, had a very small eyeball, in which could be seen a reddish yellow tumor with vessels. Glioma was suspected, and the eye was enucleated after a period of observation of three weeks. Examination of the eye revealed a hyaloid artery with a formation of connective tissue.

A small spicule of glass about 4mm in length entered the eye through the ciliary region in the case described by CLAIBORNE (514, **Piece of glass in the crystalline lens**). The iris was prolapsed and cut off. The eye became quiet and after a year the boy returned to school with  $\frac{2}{80}$  vision. The X-ray showed the glass to be back of and to the inner side of the lens, in which some opacities have begun to appear.

ALLING.

BONNEFON (513, **Contusion cataract**) observed, after a contusion of the eye, an opacity at the anterior pole of the lens about as large as the normal pupil, with straight lines radiating toward the periphery. In the course of three weeks the opacity had disappeared with the exception of two lines. He then studied experimentally the pathogenesis of contusion cataract produced by blows on the eyes of rabbits. According as the blow was more or less severe, he observed temporary or permanent linear or stellate opacities at the anterior or the posterior pole; generally stationary opacities in the anterior cortical; diffuse milky opacity in the posterior cortical. The lesions in the capsular epithelium might be produced either directly by the instrument with which the blow was inflicted, through the indented cornea, or indirectly, perhaps by the fact that the compressed aqueous drove the equator of the lens backward while the anterior pole came forward. Shallow grooves were almost always found in the cortical substance at the place of the normal commissures, which corresponded in time to the injury of the capsular epithelium. If the wound in the capsule closed quickly, the aqueous pressed into these grooves was absorbed, the capsular epithelium regenerated rapidly, and *restitutio ad integrum* followed. The same changes were found in the posterior cortex, but their presence indicated a more severe contusion. A remarkable point is that the transparency of the media was not impaired, at least at first. In more severe contusions a rupture of the posterior capsule was almost always found, and here the conditions for



closure are less favorable. The opacities in the posterior cortex therefore arise in this manner: If the laceration in the capsule is large, the various forms of cataract appear with opacity of the peripheral layers and of the anterior cortex. In all cases it is impossible to detect the solution of continuity of the posterior capsule by clinical examination. If a cataract follows a contusion, a laceration of the capsule is almost always the cause, and this is to be sought in the posterior capsule in most cases, especially when the opacity begins in the posterior cortex.

CAUSÉ.

LAMBERT (518, **Removal of the lens in high myopia**) has operated upon nine eyes with uniformly good results. The extremes in age were 16 and 50. He does not consider advanced age to be a contra-indication. He advocates needling followed by linear extraction in young persons, but in patients over fifty a preliminary iridectomy should be done before extraction. If no inflammatory processes are going on, he does not regard fundus changes as prohibitive, and thinks that retinal detachment is not likely to occur as the direct result of the operation.

ALLING.

#### XVII.—VITREOUS.

522. BUGAEFF. **A rare case of bridge formation in the vitreous.** *West. Ophthalm.*, Nov., 1912.

BUGAEFF'S (522, **Bridge formation in the vitreous**) patient, 21 years old, complained of photophobia in his left eye, which was externally normal and the media clear. With the ophthalmoscope could be seen a shining, clear, greenish bridge which covered the upper part of the fundus. Only the lower crescentic margin of the disk could be seen; the rest of the papilla was covered by a gray, fibrous membrane which extended forward to the vitreous and joined the bridge. The latter could be seen distinctly lying in the vitreous in front of the retina. The retinal vessels were small and abnormal in position. Vision was 0.5-0.6; H. 2 D.; crescentic coloboma of the retina 1 p. d. broad; otherwise the fundus was normal. Traces of inflammation, in the form of a heaping of pigment,



suggested retinitis proliferans, although it may be supposed that the bridge was the result of defective construction of the eye.

V. POPPEN.

# XVIII.—CHORIOID.

523. ALT, A. Sympathetic chorioiditis. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

524. MARPLE, W. B. Tubercle of the chorioid in tuberculous meningitis. *Ophthalmoscope*, Dec., 1912.

525. WEEKERS. Tumor or pseudo-tumor of the ciliary body and of the chorioid resembling tuberculoma. *Soc. belge d'ophtalm.*, Nov. 24, 1912.

526. WESCOTT, C. D. Flat sarcoma of the chorioid. *Trans. Amer. Ophthalm. Society*, 1912.

WEEKERS (525, Tumor or pseudo-tumor of the ciliary body and chorioid resembling tuberculoma) observed a slight ciliary injection in a patient suffering from lupus and the third stage of pulmonary tuberculosis. By oblique illumination he could see a brownish mass just behind the lens, below and inward. Upward and outward were whitish masses, evidently produced by a detached retina. By scleral transillumination the mass appeared to be solid and transparent. The tension of the eye was somewhat lowered. He thinks this a case of metastatic tuberculoma of the ciliary body and uvea.

Coppez thought that the tumor was not tuberculous because of the absence of signs of reaction and the transparency of the vitreous. Furthermore the surface of a tuberculoma is less smooth and such tumors have a tendency to advance to the anterior chamber, detaching the root of the iris. An injection of old tuberculin would have made the diagnosis positive.

DANIS.

Up to Jan., 1912, MARPLE (524, Tubercle of the chorioid in tuberculous meningitis) found tubercle of the chorioid in only about 5% of his cases of tuberculous meningitis. Believing this to be too low, he had his patients examined several times daily with his electrical ophthalmoscope. In a series of 13 cases tubercles were present in 100%. In all cases examined Descemet's membrane was clear.

GROUT.

Less than fifty cases of this form of sarcoma have been reported. WESCOTT (526, Flat sarcoma of the chorioid) adds

two more. In both the tumors had extended through the eyeball into and along the side of the optic nerve.

ALLING.

ALT (523, **Sympathetic chorioiditis**) presents the case of a boy of nine who lost an eye through inflammation following a wound in the sclero-corneal region. About two months later, signs of sympathetic inflammation appeared in the other eye—scleral congestion, small pupil, deposits on the anterior capsule, and dust-like opacities in the posterior vitreous. The papilla was congested, the retinal veins enlarged and tortuous. The eye cleared under appropriate treatment, but later there were discovered a number of chorioidal spots in the inferior equatorial region. These, the author thinks, did not appear until two months after the onset of the sympathetic ophthalmia, and at a time when all other signs had disappeared, except the slight redness of the disk and the tortuosity of the veins. These spots were round and sharp in outline, whitish or yellowish in color. During the following weeks others appeared. Gradually the larger patches assumed a pinkish color and some of the smaller ones disappeared. The case seems to be one of the few observed in which sympathetic chorioiditis has occurred without a previous cyclitis, although there was a mild iritis. The enucleated eye showed the inflammatory signs most severely in the retina, especially in the posterior parts, where the chorioid was least affected. The inflammation was of the hemorrhagic and proliferating type.

ALLING.

#### XIX.—SYMPATHETIC OPHTHALMIA.

527. PETERS. **Sympathetic ophthalmia and disturbances of the hearing.** *Klin. Monatsbl. f. Augenheilkunde*, Oct., 1912, p. 433.

528. THOMSON, E. S. **Sympathetic optic neuritis.** With report of a case. *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

PETERS (527, **Sympathetic ophthalmia and disturbances of hearing**) observed a case in which deafness followed a sympathetic ophthalmia. The deafness was labyrinthine and accompanied the first attack of the sympathetic ophthalmia. More attention should be given the connection of this simultaneous aural trouble than has been given it hitherto, because

of its importance to the pathogenesis of the disease. The deafness in the five reported cases did not appear to be due to a meningitis, but to labyrinthine trouble, and he questions whether the pigment of the labyrinth does not play an important part in its origin

THOMSON'S (528, **Sympathetic optic neuritis**) case, a male of 32, had lost his left eye in youth from injury with a stick. The eye showed a degenerated iris and calcareous lens, but was not inflamed or glaucomatous. The other eye was clear, but the optic nerve was blurred and of a dull white appearance, similar to that of a nerve passing into post-neuritic atrophy. The vision was  $\frac{1}{200}$ . There was no evidence of constitutional disease and the Wassermann reaction was negative. Enucleation of the blind eye was performed and the optic nerve was found reduced to a string of fibrous tissue. The nerve of the other eye cleared later and the vision improved to  $\frac{20}{100}$ . The field, which was much contracted, did not change. He thinks that the optic neuritis had been present for at least six months. He gives extracts of similar cases from literature, and points out the importance of watching cases in which there is an eye capable of exciting sympathetic disease since the neuritis is insidious in onset.

ALLING.

## XX.—GLAUCOMA.

529. FOURRIÈRE. **Tonometric studies of glaucoma.** *Thèse de Paris*, 1912.

530. GRUENING, E. **The operation of combined iridectomy and sclerotomy for chronic glaucoma.** *Trans. Amer. Ophthalm. Society*, 1912.

531. LANGE. **Glaucoma.** *Klin. Monatsbl. f. Augenheilk.*, Nov., p. 540.

532. TOOKE, F. **Calcareous degeneration of the cornea and lens capsule.** *Trans. Amer. Ophthalm. Society*, 1912.

533. VERHOEFF, F. H. **Sclerosis of the ligamentum pectinatum and its relation to glaucoma.** *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

LANGE (531, **Glaucoma**) has observed two new cases that show that the glaucomatous excavation can be refilled not only after operations but also after the use of meiotics. He also shows the frequent occurrence of simple glaucoma in myopic eyes (43%), while hypermetropia is present in 86% of the cases of inflammatory glaucoma. Inflammatory glaucoma

is much more common in women than in men, while the reverse is true of simple glaucoma. He reports a typical attack of glaucoma following the use of homatropine for diagnostic purposes. In one case of simple glaucoma he observed an increase of the tension following the use of eserine; this he ascribes to the diminution of the perilenticular space, and the disturbance of circulation between the anterior and posterior chambers thus caused, which was produced by the meiotic. He deprecates the use of the term inflammatory glaucoma, as the condition is not one of inflammation, but of engorgement of blood or lymph, and reiterates the proposal he made in 1896 to change the name to hæmostatic glaucoma.

The theory that glaucoma may be produced by sclerosis of the ligamentum pectinatum, which interferes with the drainage by narrowing the channels leading to Schlemm's canal, is disproved by VERHOEFF (533, **Sclerosis of the ligamentum pectinatum**). He examined ten eyes enucleated for glaucoma—three were primary, one hemorrhagic, and six secondary. Some of the cases show the iris pulling away from the ligament, proving that the peripheral synechiæ were once complete. The sclerotic changes in all cases were found chiefly on its surface. Moreover, the fact that the condition appeared in the eyes with secondary glaucoma as well as in the primary form seems convincing evidence that the sclerosis was not the original cause of the glaucoma. The changes in the ligamentum pectinatum consisted in the formation of vascularized connective tissue, hyalin and elastic tissue, during the persistence of the adhesion of the iris root. If the iris is pulled away by cicatricial contraction, or by the sphincter, the corneal endothelium may grow over and new tissue form beneath it.

ALLING.

TOOKE (532, **Calcareous degeneration of the cornea and lens capsule**) enucleated a glaucomatous eye which had been lost as the result of inflammation following a traumatic ulceration of the cornea. The microscope showed deposits of lime salts in the superficial layers of the cornea, especially over the pupillary region and at the limbus. The lens capsule also was found to be calcareous and to contain a clear fluid resembling vitreous.

ALLING.



After mention of various tonometers FOURRIÈRE (529, **Tonometric studies of glaucoma**) describes the one devised by Schioetz and gives the indications and contra-indications for its use. He gives the tension of the normal eye as 12-27mm. Direct dependence of the tension of the normal eye upon the blood pressure does not seem to exist. The influence of age, refraction, time of day, light, accommodation, and convergence, are briefly mentioned, mainly as unimportant. Holocain had no effect in a patient with neuroparalytic keratitis. In his experiments on normal eyes, cocaine sometimes increased, sometimes decreased, the tension; atropine, scopolamine, and stovain had no effect, and eserine reduced the tension somewhat. In acute glaucoma the tension is much elevated, usually to 70mm, or it may be more. The tension in subacute glaucoma fluctuates greatly, from normal to very high. The apparently healthy eye in monolateral subacute glaucoma has a somewhat elevated or a normal tension, yet with many fluctuations; in many cases it is and remains normal. The tension is elevated in buphthalmos and may be slight or high in simple glaucoma. Meiotics affect glaucomatous eyes differently; sometimes they have no effect, in other cases they reduce the tension. In four cases of increased tension in syphilitics, complicated with other diseases of the eye, it is interesting to note that the tension fell quickly after intravenous injections of salvarsan.

In ten cases of acute glaucoma, iridectomy rarely had a permanently good effect on the tension; a slight rise often took place, which responded promptly to meiotics. In a number of cases the hypertension persisted, or returned after sinking; iridectomy is therefore not an ideal remedy. The results of the operation in subacute glaucoma are similar. Sclerectomies reduced the tension considerably in seven cases of subacute glaucoma. Sometimes a slight hypertension appeared perhaps a month after the operation, but responded well to meiotics. Three were cured by the operation, the others were improved, but not cured. In 4 cases of simple glaucoma the result of the operation on the tension was satisfactory. In secondary glaucoma the effect of the operation varies according to the primary changes. In pareses of the sympathetic there is a rather slight tension of the eye on the paralytic side.

GRUENING (530, **The operation of combined iridectomy and sclerotomy**) has performed the operation introduced by La Grange twenty-one times, and concludes that if it is carefully done under general anæsthesia it is preferable to simple iridectomy, because the wound heals more quickly since it is covered by the conjunctiva, and because his results are better than by the older operation. He thinks that the incision should not be as long as 12mm, as some illustrations have made it.

ALLING.

#### XXI.—RETINA.

534. DAVIS, A. E. **Recurrent retinal hemorrhages in the young, with report of a case.** *Trans. Amer. Ophthalm. Society*, 1912.

535. LINDNER. **A case of hemeralopia.** *Vienna Ophthalm. Soc.*, June 17th.

According to DAVIS (534, **Recurrent retinal hemorrhages**), the etiology of these cases is obscure, but tuberculosis, syphilis, and auto-intoxication must be considered. There are repeated hemorrhages, some breaking through into the vitreous. In the later stages retinitis proliferans develops. In his case there was a positive reaction to the tuberculin test.

ALLING.

LINDNER (535, **A case of hemeralopia**) demonstrated a case of hemeralopia with a peculiar fundus. The hemeralopia was congenital. The parents were consanguineous. The case was a connecting link between retinitis punctata albescens and the hemeralopia with clear fundus described by Oguchi. There was a whitish discoloration about the macula, which itself was dark. In the right macula were other bright lines, in the left several rows of bright spots, which, as well as the lines, extended over the entire fundus.

#### XXII.—OPTIC NERVE AND VISUAL TRACT.

536. BRUNER, W. E. **Hereditary optic atrophy with X-ray findings.** *Trans. Amer. Ophthalmological Society*, 1912.

537. CAUVIN. **Acromegaly. Tumor of the hypophysis. Ocular troubles. Organo-, and radio-therapy.** *Arch. d'ophthalm.*, lxxxii., p. 657.

538. DESCHWEINITZ, G. E., and HOLLOWAY, T. B. **A clinical communication on certain visual-field defects in hypophysis disease, with special reference to scotomas.** *Jour. Amer. Med. Assoc.*, Sept. 21, 1912.

539. HANSELL, H. F. A case of transient blindness complete in one eye, partial in the other, with double optic atrophy. *Trans. Amer. Ophthalmological Society*, 1912.

540. LAUBER. Three cases of colloid deposits on the optic nerve. *Vienna Ophthalmological Society*, Dec., 1912.

541. SWEET, W. M. A case of primary intradural tumor of the optic nerve. *Trans. Amer. Ophthalm. Society*, 1912.

BRUNER (536, **Hereditary optic atrophy**) found by X-ray examination in the case of a man of 36 a decided enlargement of the sphenoidal cells. The patient gradually lost his sight during six months' time in spite of all treatment, including a decompression operation. There was secondary atrophy, vision was counting fingers, and the fields were peripheric on the temporal side.

An uncle, a brother, a sister, and a nephew all suffered from eye diseases showing optic atrophy. Two of these were examined by X-ray and enlarged sphenoidal cells found. Just what these findings indicate in connection with the atrophy he is unwilling to say. The cases were evidently examples of Leber's hereditary atrophy. ALLING.

CAUVIN (537, **Acromegaly**) gives the clinical history of a case of acromegaly with visual disturbances caused by a tumor of the hypophysis. Considerable improvement was obtained by organotherapy combined with treatment with radium. The disease began in a woman, 22 years old, with amenorrhea, voracious hunger, and intense headaches. Gradually the usual signs of cerebral pressure, dizziness and vomiting, developed, together with adiposity, acromegaly of the limbs, and finally ocular symptoms, which first guided the diagnosis in the right direction. The treatment mentioned had a brilliant effect upon the general condition and the eye symptoms. The vision of the right eye, which had been completely lost, improved to 0.1 in spite of a marked atrophic discoloration of the papilla, while that of the left eye improved from 0.1 to 0.9. The visual field underwent a corresponding improvement. The amenorrhea, adiposity, and acromegaly were not affected; this he considers a bad prognostic sign in spite of the observation having lasted three years. CAUSÉ.

Although a bitemporal hemianopsia is so frequently found in diseases of the hypophysis, DESCHWEINITZ and HOLLOWAY



(538, **Visual-field defects in hypophysis disease**) point out that lateral homonymous and nasal hemianopsia may also occur. As the pressure is sometimes from vascular and cystic growths, variations in the fields are constantly to be found in the same subject. The scotomas are small and paracentral, later expanding into a complete hemianopsia. Quadrant defects up and out may be found, and occasionally a scotoma has been noted in the temporal field at a considerable time before the whole field is obliterated. They believe that the small percentage of field defects found by former observers in acromegaly and hypophyseal disease is due to the fact that examinations may have been made when the scotomas were not present, and that sufficiently careful search was not made.

ALLING.

A girl of 8 came to MANSELL (539, **Transient blindness**) with double optic neuritis and œdema of the adjoining retina and muscle paralysis. The right eye was entirely blind, fingers could be counted with the left. There was no history of tuberculosis or syphilis, and no other cause could be found. After lumbar puncture and treatment with mercury and iodide the eyes returned to normal.

ALLING.

In LAUBER'S (540, **Colloid deposits on the optic nerve**) cases the margins of the papillæ were slightly indistinct, while upon them, or in the neighboring retina, were several transparent, hyaline masses. The vision in the first case was normal; in the second, there was a scotoma near the point of fixation; in the third, one eye had been rendered blind by a tumor of the hypophysis, while with the other fingers could be counted to two meters. He then mentions a case observed by Dimmer in which paracentral scotoma was present. As there were no other pathological changes in the retina it would seem as though the scotomas must be connected with the colloid deposits. The neuritic changes found in many cases may be explained by the colloid deposits acting as foreign bodies and so setting up an inactive inflammation with a corresponding impairment of vision.

The elongated, encapsulated tumor removed by SWEET (541, **Primary intradural tumor of the optic nerve**) involved the optic nerve from nearly its entrance into the eyeball to the apex of the orbit. Its dimensions were 39mm by 25mm.



Its nature could not be definitely decided, but it was thought to be a fibrosarcoma.

ALLING.

XXIII.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.

542. BIRCH-HIRSCHFELD. Blinding of the eyes by sunlight. *Zeitschrift f. Augenheilkunde*, xxviii., p. 324.

543. DESCHWEINITZ, G. E. Fracture of the skull with hemorrhage into the optic-nerve sheaths and retina. Microscopic examination of the eyeballs. *Trans. Amer. Ophthalm. Soc.*, 1912.

544. LEWIS, G. G. Two interesting cases of foreign body in the eye. *Annals of Ophthalmology*, Oct., 1912.

545. ROY, I. M. Revolver bullet in the chiasm; consecutive binocular blindness. *Ophthalmology*, Oct., 1912.

546. WOOD, CASEY A. Burns of the eyeball from the contents of so-called "water core" golf balls. *Ophthalmic Record*, Oct., 1912.

In BIRCH-HIRSCHFELD'S (542, **Blinding of the eyes by sunlight**) 32 cases he found a little, round, oval, or irregular scotoma, usually central, less often paracentral, measuring from  $\frac{1}{2}$  to  $1^{\circ}$  in diameter in the majority of cases. The scotoma was positive and absolute. To it was added a relatively color-blind area, usually excentrically below, with a maximum diameter of  $4^{\circ}$ . There was a second relatively color-blind zone, such as is to be found in normal eyes. The anatomical basis of the picture is as follows: While in blinding with the ultra-violet rays there is a distinct chromatolysis and vacuolization of the ganglion cells and of the internal granular layer, in blinding with the sun's rays there is a swelling and warping of the outer segments of the rods and cones, followed very soon by a swelling and hyperchromatosis of the bodies of the rods and cones and a distinct involvement of the pigment epithelium and the chorioid. As to the cause, the writer ascribes the chief importance to the luminous rays.

"Water core" golf balls contain some highly irritating solutions which, as in the case reported by WOOD (546, **Burns of the eyeball from the contents of so-called "water core" golf balls**), may squirt into the eye and produce burns which are more or less serious.

ALLING.

LEWIS (544, **Foreign body in the eye**) describes a case in which a bird-shot entered through the eye and became encysted within the orbit. Three weeks later the vitreous was filled with opacities and the vision was only  $\frac{2}{200}$ . About six

months after the injury the eye was found to be entirely cleared with normal vision. There was an opaque spot just below the macula, showing where the shot had passed through the eyeball. The other case was that of a boy whose eyes were injured by an exploding cap. Traumatic cataracts were formed and were successfully absorbed by needling. Dark spots were observed in the iris angle of each eye and were thought to be pieces of metal. There was no reaction, the vision was normal, and no attempt was made to remove the foreign bodies.

ALLING.

DESCHWEINITZ (543, **Fracture of the skull with hemorrhage into the optic-nerve sheaths and retina**) found a hæmatoma of the optic sheath in the case of a man who died as the result of fracture of the skull and in whose eyes retinal hemorrhages had been found. The blood in the sheath may be derived from vessels injured by fracture extending through the optic foramen, as is probably usually the case, but it may also enter the sheath through a perfectly intact canal in the same manner as fluid may be artificially forced by being injected into the arachnoidal space. Retinal hemorrhages are not pathognomonic of hæmatoma of the sheath in brain traumatism, but are suggestive. The condition may sometimes be present without retinal hemorrhages.

ALLING.

In the case recorded by ROY (545, **Revolver bullet in the chiasm**) the bullet crossed the left orbital cavity, injuring the vaginal sheath, and came to rest in the chiasm, producing hemianopsia in the left eye and optic-nerve atrophy with total blindness in the right. The location of the bullet was confirmed by the X-ray.

ALLING.

## BOOK REVIEWS.

**XXVI.—Surgery of the Eye** (A Hand-Book for Students and Practitioners). By ERVIN TÖRÖK, M.D., Surgeon to the New York Ophthalmic and Aural Institute, Ophthalmic Surgeon to Beth Israel Hospital, Consulting Ophthalmologist to the Tarrytown Hospital, and GERALD H. GROUT, M.D., Assistant Surgeon to the New York Ophthalmic and Aural Institute; Instructor in the Eye Department, Vanderbilt Clinic; Consulting Ophthalmologist of the Bellevue Hospital, First Division. With five hundred and nine original illustrations, one hundred and one in colors, and two colored plates. Price \$4.50 net. Philadelphia and New York: Lea and Febiger, 1913.

The authors disprove the Horatian quip "*Brevis esse laboro, obscurus fio.*" Their book is not only terse in style, but also simple, direct, and lucid. On 488 pages of descriptive text, 509 illustrations are presented, and in fourteen chapters the diagnosis of the operative diseases of the eye and the technique of the many operations are very ably elucidated. While the authors may be congratulated on the production of so admirable a book, mention may be made of the fact that the various chapters are somewhat unevenly treated. The chapter on the dominant eye operation, the extraction of cataract, has evidently been written as a labor of love, and possesses the vivacity and richness of detail born of experience. The chapter on the operations of the orbit, on the other hand, is not sufficiently elaborated. The very important orbital affections resulting from disease of the accessory sinuses are barely mentioned.

The more recent operations for chronic glaucoma, viz. Langer's sclerecto-iridectomy and Elliott's trephining of the

sclera, are minutely described. The illustration of the scleral incision of the Lagrange operation is copied from the original papers of Lagrange in the *Archives d'ophtalmologie* and in the *Ophthalmoscope*. The illustration is correctly copied, but the original is faulty. The incision measures 12mm instead of 7mm. An incision of 12mm in an eye with a tension of 50mm (Schiötz) would invite prolapse of the vitreous.

In the illustrations of the cataract operations, American and European methods of holding Graefe's knife, the cystotome, the spoon, etc., are paralleled. In the opinion of the reviewer, geographical or ethnographical ways of operating have no existence. A right-handed, a left-handed, an ambidextrous man will choose a position of vantage and stand either before or behind the patient. The late Herman Knapp, who possessed such consummate skill in the operation of cataract, placed himself behind the patient and used his right hand for the right eye, and his left hand for the left eye. This method cannot be called distinctively American. The authors evidently wish to show that in the handling of the instruments in these delicate operations rigid rules cannot be prescribed, and a certain latitude must be granted to individual aptitude.

On page 236 the word "synechia" is twice used as a plural. It is a singular; the latinized plural is synechiæ. This may be a typographical error.

The reason for the difficulty in the removal of the small nucleus of a Morgagnian cataract is that in pricking the capsule with the cystotome the pupillary area is immediately obscured by the evacuated fluid, and the cystotome is withdrawn before a suitable opening of the capsule is made. The authors give a different explanation. Homer Smith's operation for ripening immature cataracts is safe and speedy and should have been mentioned.

The name of Knapp is often quoted. There are several Knapps known in Ophthalmic literature. Historical accuracy and the principle of "suum cuique" demand that the given names be prefixed to the patronymic whenever an author is quoted.

The criticisms of the reviewer refer to minor points and do not detract from the true value of this very useful book. The



complete alphabetical index is of much assistance in rapid orientation.

The publishers deserve much credit for the general make-up of the book. It has the appearance of a *de luxe* edition, is well printed on good, but glazed paper, widely margined, and strongly and attractively bound.

E. GRUENING.

**XXVII.—Ophthalmic Semiology and Diagnosis.** By Dr. CHAS. H. BEARD of Chicago. Being one of the volumes of An International System of Ophthalmic Practice, edited by Dr. W. L. Pyle. With 13 colored plates and 71 figures in the text; pp. 400. Phila.: P. Blakiston's Son & Co., 1012 Walnut St., 1913. Price \$4.00.

The author confines his labors to the subject of symptomatology and diagnosis of conditions of the eye. In the first edition of a book which attempts to treat a subject in a special way, we must expect to find omissions. This one is not an exception to the rule.

In dealing with increased intraocular tension, Beard assumes that "the reader is familiar with the other objective and subjective signs of glaucoma"—(than increased intraocular tension). If the reader is a general practitioner he is probably not familiar with all the other signs of glaucoma, and hypertension is the one with which he may be familiar. We can not help being disappointed that this subject, which is so prolific of interesting discussion and so important both to the ophthalmologist and to the practitioner in other branches of medicine and surgery, should be dismissed by the author with less than two pages.

The symptomatology of trachoma is inadequate and that of many minor conditions which we should expect to find in the first part of the work are entirely omitted. While the chapter on the iris is well written and instructive, it could be improved by the addition of more matter in regard to differential diagnosis of the various kinds of iritis and iridocyclitis, etc. Conditions of the ciliary body and malignant tumors of the iris seem to have been almost overlooked. The chapters on the pupil and on the lens show a great deal of literary research in these subjects, and the author is to be

congratulated on his clear and exhaustive presentation of the chief characteristics of variations in pathological conditions of the pupil and lens.

The second part of the work, dealing with conditions behind the lens, is beautifully illustrated with a number of the author's original drawings of the fundus. The cases are well selected to convey the lessons which they are intended to teach. Some of them are reproduced in their original colors, and it is to be regretted that they all were not thus shown; but notwithstanding this, the reproduction is so good that they will not fail to be appreciated by the student. What is particularly pleasing about these drawings is that they are in no way diagrammatic, but represent as nearly as possible the true pictures of the conditions seen. The mistake, too often made, of emphasizing a point which the author wishes to make, is absent in Beard's drawings. The treatment of each subject in this part of the work is comprehensive and is put before the reader in very clear language. The minute details of the ophthalmic pictures are intelligently discussed. The chapters on the blood-vessels and vascular changes are particularly well done. Perhaps the only criticism we might offer is, as in the first part of the work, bearing on the subject of omission. We think that a little more from the author about retrobulbar conditions, choroidal and vitreous changes, various kinds of exudates in retina and vitreous, and malignant tumors in the fundus would be appreciated. The inclusion of an extended discussion of these in a future edition would add greatly to the value of the work. On the whole the book is interesting reading, the manner of approaching the subject is new, and it contains a great deal of useful information.

E. J. CURRAN.

## MISCELLANEOUS NOTES.

THE HERMAN KNAPP MEMORIAL EYE HOSPITAL has opened its doors in its new location, at the s. w. corner of 57th Street and Tenth Avenue. It is a continuation of the "New York Ophthalmic and Aural Institute," which was founded by the late Dr. Herman Knapp in 1869, and has been in uninterrupted activity at 44 and 46 East 12th Street.

The new building is a specially constructed seven-story fire-proof hospital building, with complete modern equipment for the treatment and study of diseases of the eye. Special attempts will be made to continue the work of the School of Ophthalmology, and instruction in the following branches will be given:

1. Ophthalmic Clinics
2. Refraction and Methods of Examination
3. Ophthalmoscopy.
4. External Diseases
5. Operative Surgery
6. Pathology and Bacteriology
7. Physiologic Optics.

Any information about these courses can be obtained by addressing Dr. Arnold Knapp at the Hospital, 500 West 57th Street, New York City.

## TWELFTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

ST. PETERSBURG, JULY 28 TO AUGUST 10, 1914.

Central Bureau: St. Petersburg Eye Clinic, Mochowaja 38.

Those interested in Ophthalmology are particularly urged to visit the Congress in St. Petersburg in the year 1914. There

will be a reduction in price of 50% on all the Russian railroads. Numerous steamship lines running to St. Petersburg have also announced a reduction in their rates. Every facility will be granted to the guests who, at the conclusion of the Congress, wish to continue their travels in Russia. Those arriving from over the seas will be met at the seaports by interpreters.

Those who wish to announce their participation in the Congress are requested to send their visiting cards with full name and exact address to the Secretary. The Congress dues must be transmitted in Russian money. 25 Francs = 9 Rubels and 50 Kopeks. The membership cards will then be sent out, probably in the beginning of 1914.

St. Petersburg, August, 1913.

President, Prof. L. G. BELLARMINOF.  
General Secretary, Dr. TH. GERMANN.



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Fig. 1.

Dr. Knapp's Case of Tubercle at Optic Disc showing local reaction after diagnostic tuberculin injection.







Fig. 2.  
Dr. Knapp's Case of Exudative Retinitis.





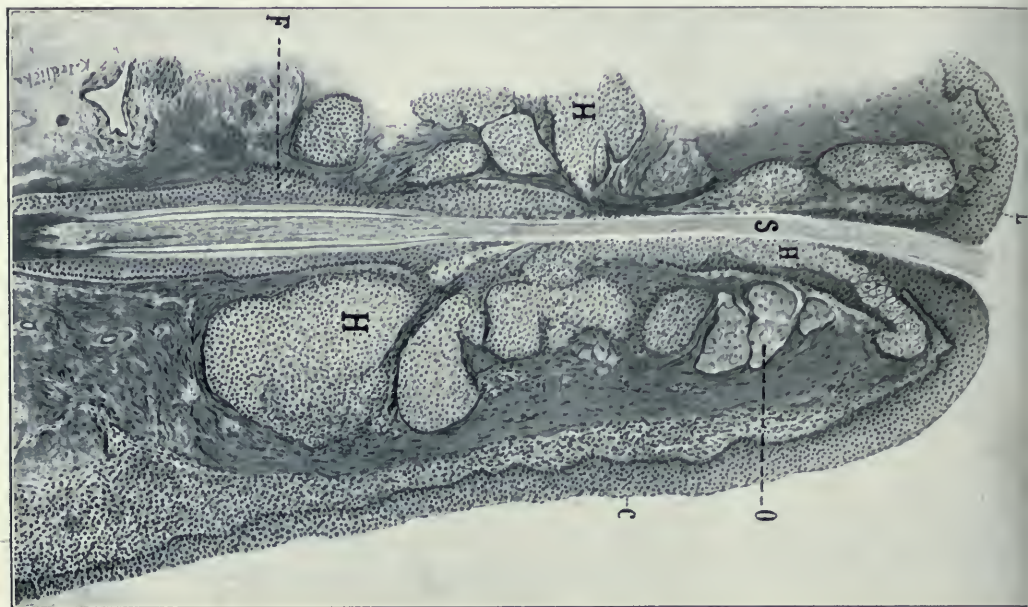


Fig. 1.

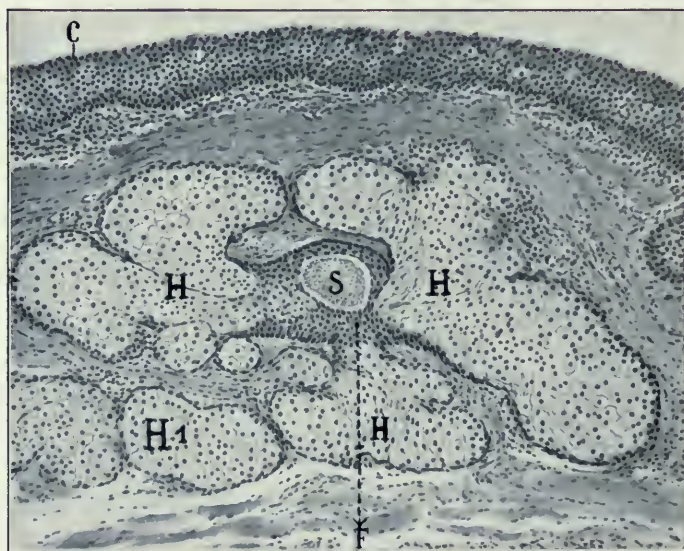


Fig. 2.

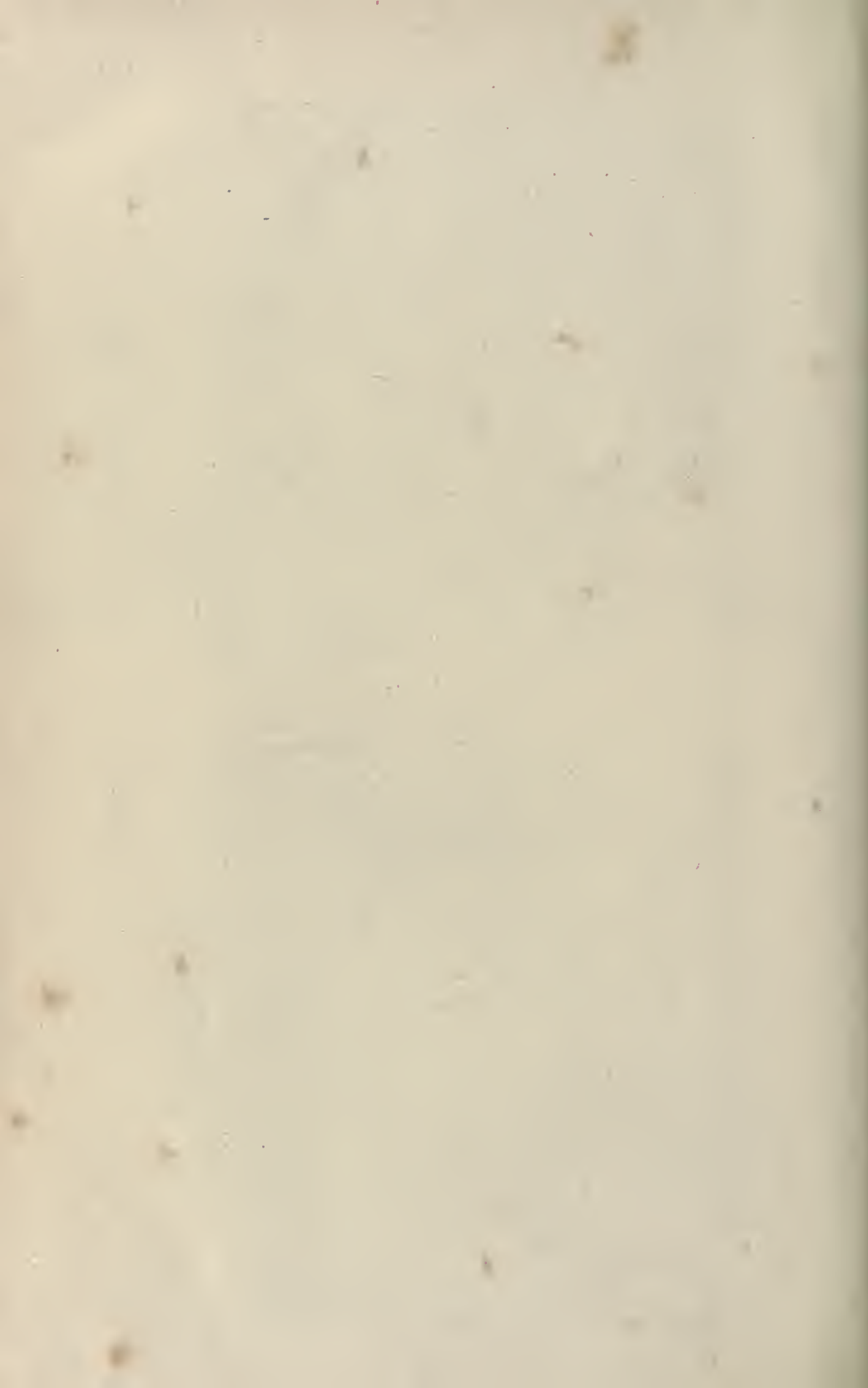




Fig. 3.



Fig. 4.





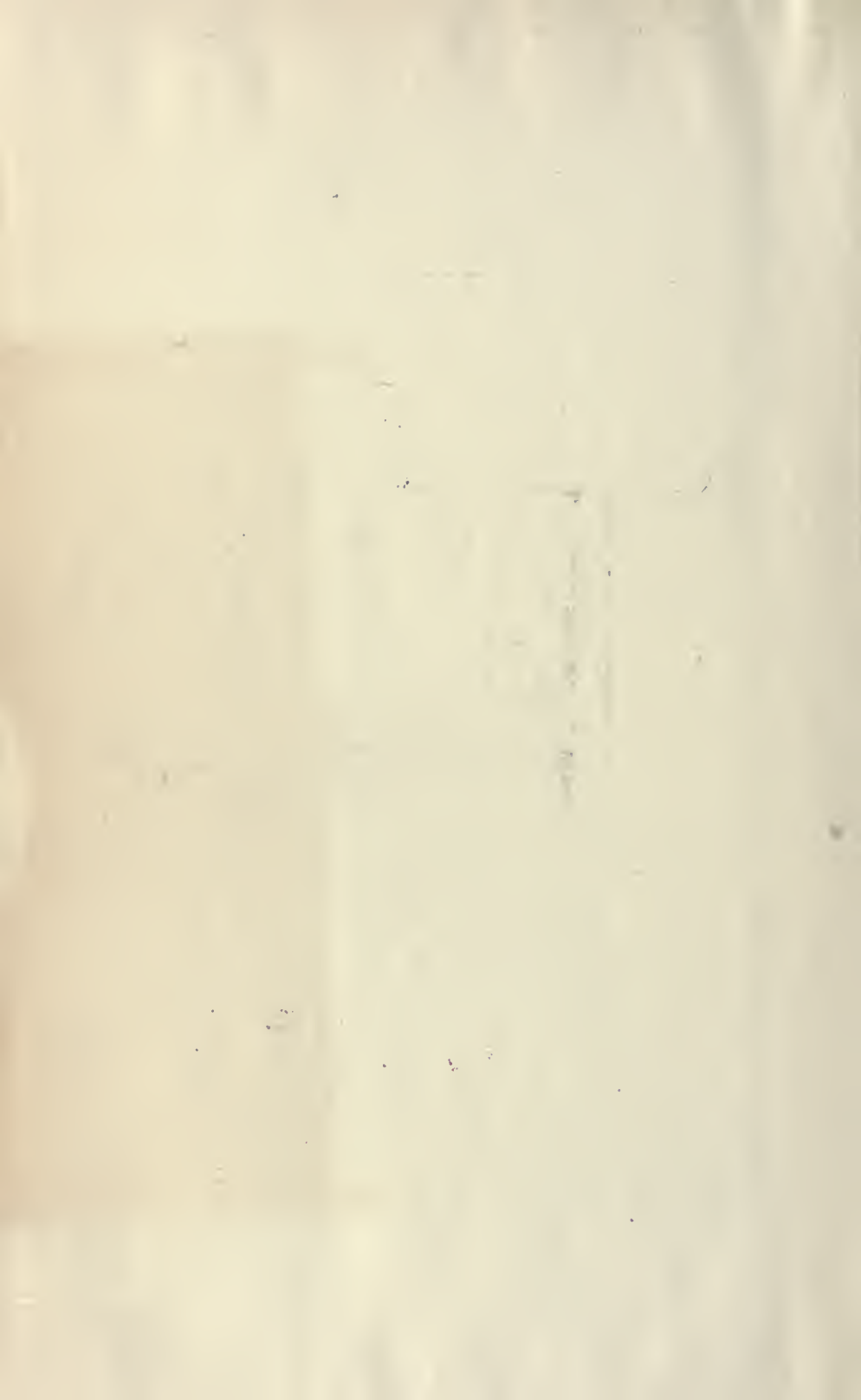














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